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BAKER (MICHAEL) JR INC BEAVER PA

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NATIONAL DAM INSPECTION PROGRAM. PURDY (STUMP POND) DAM. (NDI N--ETC(U)

DACW31-81-C-0011

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LEVEL
SUSQUEHANNA RIVER BASIN

SALT LICK CREEK, SUSQUEHANNA COUNTY
PENNSYLVANIA

(P)

PURDY (STUMP POND) DAM

NDI No. PA 00063

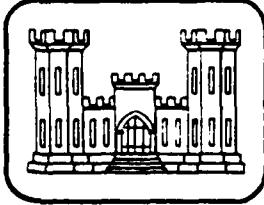
PennDER NO. 58-11

Dam Owner: Pennsylvania Fish Commission



PHASE I INSPECTION REPORT NATIONAL DAM INSPECTION PROGRAM

ACW 31-81-C-0611



prepared for

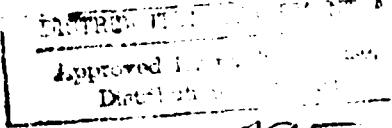
**DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203**

prepared by

MICHAEL BAKER, JR., INC.

Consulting Engineers
4301 Dutch Ridge Road
Beaver, Pennsylvania 15009

February 1981



"Original contains color
plate(s). All items reproduct-
tions will be in black and
white."

815 18 050 410795

SUSQUEHANNA RIVER BASIN

(C)

PURDY (STUMP POND) DAM
SUSQUEHANNA COUNTY, COMMONWEALTH OF PENNSYLVANIA
NDI No. PA 00063
PennDER No. 58-11

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM.

Purdy (Stump Pond) Dam. (1/2 km.
W of the Pennjet Inn - 1-1-1)
Susquehanna River, Susquehanna County,
Susquehanna County, Pennsylvania

NTIC
MAY 13 1981

Prepared for: DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

Prepared by: MICHAEL BAKER, JR., INC.
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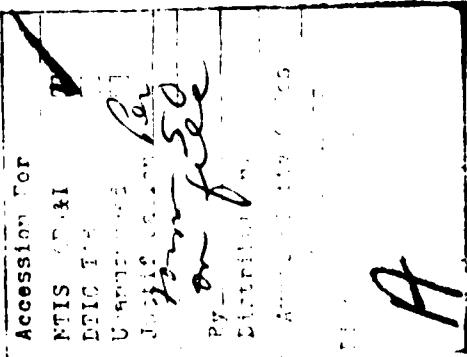
PREFACE

This report is prepared under guidance contained in the "Recommended Guidelines for Safety Inspection of Dams," for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.



PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Purdy (Stump Pond) Dam, Susquehanna County, Pennsylvania
NDI No. PA 00063, PennDER No. 58-11
Salt Lick Creek
Inspected 27 October 1980

ASSESSMENT OF
GENERAL CONDITIONS

Purdy (Stump Pond) Dam is owned by the Pennsylvania Fish Commission and is classified as a "Significant" hazard - "Small" size dam. The dam was found to be in fair overall condition at the time of inspection.

Hydraulic/hydrologic evaluations, performed in accordance with procedures established by the Baltimore District, Corps of Engineers, for Phase I Inspection Reports, revealed that the spillway will not pass the 100-year flood without overtopping the dam. A spillway design flood (SDF) in the range of the 100-year flood to the 1/2 Probable Maximum Flood (1/2 PMF) is required for Purdy Dam. Because the dam is on the low end of the "Small" size category in terms of height and storage capacity, the 100-year flood was chosen as the SDF. During the 100-year flood, the dam is overtopped by a maximum depth of 4.32 feet for a total duration of 40.83 hours. The spillway is therefore considered "Inadequate." It is recommended that the owner immediately initiate an engineering study to further evaluate the spillway capacity and develop recommendations for remedial measures to reduce the overtopping potential of the dam.

Several items of remedial work should be immediately initiated by the owner. Item 1 below should be completed by a qualified professional engineer experienced in the design of hydraulic structures for dams. These include:

- 1) Initiate an engineering study to further evaluate the spillway capacity and develop recommendations for remedial measures to reduce the overtopping potential of the dam.
- 2) Fill the erosion gully at the right downstream abutment of the dam and reseed the area.
- 3) Remove the debris and silt at the entrance to the spillway.
- 4) Provide means to draw down reservoir during an emergency.

PURDY (STUMP POND) DAM

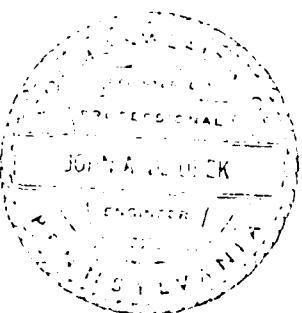
In addition, the following operational measures are recommended to be undertaken by the owner:

- 1) Develop a detailed emergency operation and warning system.
- 2) During periods of unusually heavy rain, provide around-the-clock surveillance of the dam.
- 3) When warning of a storm of major proportions is given by the National Weather Service, activate the emergency operation and warning system.

It is further recommended that formal inspection, maintenance, and operation procedures and records be developed and implemented. A plan for emergency drawdown of the reservoir should be developed in case an emergency drawdown should become necessary. These should be included in a formal maintenance and operations manual for the dam.

Submitted by:

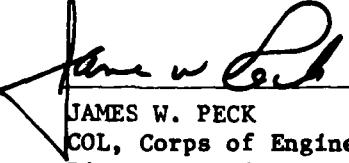
MICHAEL BAKER, JR., INC.


John A. Dziubek
Engineering Manager-Geotechnical

Date: 19 February 1981

Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS


JAMES W. PECK
COL, Corps of Engineers
District Engineer

Date: 13 MAR 81

PURDY (STUMP POND) DAM



Overall View of Dam from Left Abutment

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- Appendix B - Engineering Data Check List
- Appendix C - Photograph Location Plan and Photographs
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- Appendix E - Plates
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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
PURDY DAM
NDI No. PA 00063, PennDER No. 58-11

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

- a. Authority - The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.
- b. Purpose of Inspection - The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

- a. Description of Dam and Appurtenances - Purdy Dam is a stone masonry dam. Earthfill was placed between the outside walls and a masonry cap on top. The height of the dam is 7.4 feet and the length is 52 feet. The width at the crest is 3.5 feet with the downstream slope being in a series of terraces and vertical walls. The upstream slope appears to be similar to the downstream slope but is covered with a great deal of debris and silt and could not be observed.

The spillway is located immediately to the right of the center of the dam and consists of a stone broad crested weir and chute. The spillway crest is 11 feet long perpendicular to the direction of flow. The flow from the spillway cascades over several terraces in the spillway and over a vertical drop at the downstream end. The plunge pool is stone-lined.

There are no outlet works for the dam.

- b. Location - Purdy Dam is located on Salt Lick Creek approximately 3.2 miles east-southeast of New Milford in New Milford Township, Susquehanna County, Pennsylvania. The coordinates of the dam are N 41° 51.7' and W 75° 40'. The dam can be found on the Harford, PA USGS 7.5 minute topographic quadrangle.

- c. Size Classification - The height of the dam is 7.4 feet and the reservoir volume is 62 acre-feet at the minimum top of dam [Elevation 1409.6 feet Mean Sea Level (ft. M.S.L.)]. The dam is therefore in the "Small" size category.
- d. Hazard Classification - If the dam were to fail, property damage may occur to one trailer and two homes 10,000 feet downstream from the dam but loss of life is unlikely. There may also be damage to PA Route 492 which passes over the downstream channel 9000 feet downstream from the dam. The dam is therefore classified in the "Significant" hazard category.
- e. Ownership - The dam and reservoir are owned by the Pennsylvania Fish Commission. The person responsible for maintenance and operations of the dam is Mr. Charles Rupert, Area III Maintenance Manager, Box 88, Sweet Valley, Pennsylvania 18656.
- f. Purpose of Dam - The dam was originally constructed for water power, but is now used for fishing.
- g. Design and Construction History - There is no information available on the construction date or company responsible for designing and constructing the dam. The earliest records of the dam in PennDER File No. 58-11 date back to 1920.
- h. Normal Operating Procedures - The reservoir is maintained at the crest of the spillway (Elevation 1409.0 ft. M.S.L.). The dam is visited once a month during the late fall and winter, and approximately every other week or more frequently during the spring, summer, and early fall.

1.3 PERTINENT DATA

a. <u>Drainage Area (square miles)</u> -	6.63
b. <u>Discharge at Dam Site (c.f.s.)</u> -	
Maximum Known Flood (1977) -	115
Spillway Capacity at Maximum Pool (El. 1409.6 ft. M.S.L.) -	20
c. <u>Elevation (feet above M.S.L.)*</u> -	
Design Top of Dam -	Unknown
Minimum Top of Dam -	1409.6
Maximum Design Pool -	Unknown

*All elevations are referenced to the spillway crest, El. 1409.0 ft. M.S.L. as estimated from the USGS 7.5 minute topographic quadrangle, Harford, Pennsylvania.

Spillway Crest -	1409.0
Streambed at Toe of Dam -	1402.2
Maximum Tailwater of Record -	Unknown
d. <u>Reservoir (feet) -</u>	
Length of Maximum Pool (El. 1409.6 ft. M.S.L.) -	1825
Length of Normal Pool (El. 1409.0 ft. M.S.L.) -	1800
e. <u>Storage (acre-feet) -</u>	
Top of Dam (El. 1409.6 ft. M.S.L.) -	62
Normal Pool (El. 1409.0 ft. M.S.L.) -	54
f. <u>Reservoir Surface (acres) -</u>	
Top of Dam (El. 1409.6 ft. M.S.L.) -	12.70
Normal Pool (El. 1409.0 ft. M.S.L.) -	11.94
g. <u>Dam -</u>	
Type - Stone wall dam with earthfill and masonry cap	
Total Length (feet) -	52
Height (feet) - Design -	Unknown
Field -	7.4
Top Width (feet) -	3.5
Side Slopes - Upstream -	Vertical
Downstream -	Vertical
Zoning -	None
Impervious Core -	None
Cut-off -	Unknown
Drains -	None
h. <u>Diversion and Regulating Tunnels -</u>	None
i. <u>Spillway -</u>	
Type - Stone broad crested weir	
Location - Right of center of dam	
Length of Crest Perpendicular to	
Flow (feet) -	11
Crest Elevation (ft. M.S.L.) -	1409.0
Gates -	None
Downstream Channel - Stone-lined plunge pool	
and downstream channel	
j. <u>Outlet Works -</u>	None

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Information reviewed for the preparation of this report included File 58-11 of the Pennsylvania Department of Environmental Resources (PennDER) and the Pennsylvania Fish Commission's file for the dam. These files contained the following information.

- 1) The earliest correspondence regarding this dam consisted of a dam inspection report by the Water Supply Commission of Pennsylvania, dated 22 May 1920.
- 2) The latest dam inspection was conducted on 15 September 1965 by PennDER. They stated that the dam was in good condition except for the accumulation of debris in the spillway and downstream channel.

2.2 CONSTRUCTION

It is not known when the dam was constructed or who performed the original design and construction of the dam. The only information available concerning the construction history of the dam was obtained from the PennDER file on the dam. The information indicated that on 12 April 1938, the dam was inspected by the Water and Power Resources Board, at which time it was in ruins. The dam was then rebuilt in 1939 by the Susquehanna County Sportsmen's Association.

2.3 OPERATION

Maintenance and operations records are now kept by Mr. Chuck Rupert of the Fish Commission. The spillway is uncontrolled and the reservoir level is normally at the spillway crest. The dam is visited once a month during the late fall and winter, and approximately every other week or more frequently during the spring, summer and early fall.

2.4 EVALUATION

- a. Availability - Other than the information contained in PennDER's File No. 58-11 and the Pennsylvania Fish Commission file for this dam, no design or construction data are available.

- b. Adequacy - The information available is generally adequate for a Phase I Inspection.
- c. Validity - There is no indication at the present time to doubt the validity of the available engineering data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

- a. General - The dam was found to be in fair overall condition at the time of inspection on 27 October 1980. No unusual weather conditions were experienced during the inspection. Noteworthy deficiencies observed during the visual inspection are described briefly in the following paragraphs. The complete visual inspection checklist, field sketch, top of dam profile, and typical cross-section are given in Appendix A.
- b. Dam - An erosion gully was observed at the right downstream abutment of the dam. No other significant problems were observed.
- c. Appurtenant Structures - Some debris and sediment has accumulated in the spillway approach channel.
- d. Reservoir Area - The reservoir slopes are mild to moderate with no signs of instability. Two dams are located upstream of Purdy Dam. Both of these have been inspected by Michael Baker, Jr., Inc. and their Phase I Inspection Reports are currently being prepared. These two dams are Page's Lake Dam (NDI No. PA 00062, PennDER No. 58-5) and Fuller's Lake Dam (NDI No. PA 00073, PennDER No. 58-121).
- e. Downstream Channel - The downstream channel is crossed approximately 1.5 miles downstream by a bridge carrying PA Route 492. One trailer and two homes are located downstream of the dam. They may suffer economic damage if the dam should fail.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

There are no formal written instructions for lowering the reservoir or evacuating the downstream area in case of an impending failure of the dam.

It is recommended that formal emergency procedures be adopted, prominently displayed, and furnished to all operating personnel.

4.2 MAINTENANCE OF DAM AND APPURTENANCES

The Pennsylvania Fish Commission is responsible for the maintenance of the dam. Generally, the maintenance procedures followed by their personnel are considered adequate.

The accumulation of debris and sediment should be removed from the approach channel to the spillway.

4.3 MAINTENANCE OF OPERATING FACILITIES

There are no operating facilities for the dam. An emergency drawdown plan should be developed in case an emergency drawdown should become necessary.

4.4 DESCRIPTION OF ANY WARNING SYSTEM

There is no warning system in the event of a dam failure. An emergency warning system should be developed.

4.5 EVALUATION OF OPERATIONAL ADEQUACY

The current operational features are adequate for the purpose they serve. However, it is recommended that a formal maintenance and operations manual be prepared for the dam.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

- a. Design Data - No hydrologic or hydraulic design calculations are available for Purdy Dam.
- b. Experience Data - The maximum flood of record was reported to have occurred during the winter of 1977. At this time the depth of flow in the spillway was reported to have been 1.5 feet. This corresponds to a flow of 115 c.f.s.
- c. Visual Observations - During the visual inspection, no problems were observed which would indicate that the dam and appurtenant facilities could not perform satisfactorily during a flood event.

There is one low spot on the dam crest (Station 1+10) which is only 0.6 feet above the spillway crest.

Page's Lake Dam (NDI No. 00062) is 2050 feet upstream from Purdy Pond. Page's Lake Dam is a 162 feet long, 15 feet high, dry masonry dam with a concrete spillway 40 feet wide by 4.5 feet high.

Fuller's Lake Dam (NDI No. 00073) is 9300 feet upstream from Page's Lake. Fuller's Lake Dam is a 143 feet long, 9 feet high, earthfill dam with a trapezoidal earth spillway.

- d. Overtopping Potential - Purdy Dam is a "Small" size - "Significant" hazard dam requiring evaluation for a spillway design flood (SDF) in the range of the 100-year flood to the 1/2 Probable Maximum Flood (1/2 PMF). Because the dam is on the low end of the "Small" size category in terms of height and storage capacity, the 100-year flood was chosen as the SDF.

Using material from "The Hydrologic Study - Tropical Storm Agnes" prepared by the Special Studies Branch, Planning Division, North Atlantic Division, Corps of Engineers, in New York City, December 1975, the peak inflow to the impoundment for the 100-year flood was calculated to be 1595 c.f.s.

The hydraulic characteristics of the basin, specifically, the Snyder's unit hydrograph parameters, were obtained form a regionalized analysis conducted by the Baltimore District of the U.S. Army

Corps of Engineers. Using zero as an initial and constant loss rate, a flow of only 1170 c.f.s. was obtained; therefore, the SCS dimensionless unit hydrograph approach was used to obtain the 100-year flood hydrograph.

The hydraulic capacity of the dam, reservoir, and spillway was then assessed by utilizing the U.S. Army Corps of Engineers' Flood Hydrograph Package, HEC-1 DB. The hydrograph from Fuller's Lake Dam (NDI No. PA 00073) was routed downstream to Page's Lake Dam (NDI No. PA 00062) and combined with the runoff hydrograph for Page's Lake. It was then routed through Page's Lake Dam, downstream to Purdy Dam and combined with the runoff hydrograph for Purdy Pond.

Analyses of the dam and spillway show that Purdy Dam will be overtopped by a maximum depth of 4.32 feet for a total duration of 40.83 hours.

- e. Spillway Adequacy - As outlined in the above analyses, the spillway will not pass the SDF without overtopping the dam; therefore, the spillway is considered "Inadequate."

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

- a. Visual Observations - There were no structural inadequacies noted during the visual inspection that cause concern for the structural stability of the dam.
- b. Design and Construction Data - No design or construction data were available for review. Generally, for this type of dam, if the ratio of the width of the stonewall portion of the dam is greater than 0.5 times the height of the dam (w/h), then stability of the dam due to overturning or sliding is not a problem. (Reference "Evaluation and Repair of Stonewall-earth Dams," by Kent A. Healy, Proceedings of "Safety of Small Dams," New England College, Henniker, New Hampshire, August 4-9, 1974, pp 149-178). The w/h ratio for this dam is close to one and no sign of instability was observed during the visual inspection, therefore, further assessments of the structural stability are not considered necessary.
- c. Operating Records - No operating records are available. Nothing in the procedures described by the owner's representative indicates concern for the structural stability of the dam.
- d. Post-Construction Changes - No changes adversely affecting the structural stability of the dam have been performed.
- e. Seismic Stability - The dam is located in Seismic Zone 1 of the "Seismic Zone Map of the Contiguous United States," Figure 1, page D-30, "Recommended Guidelines for Safety Inspection of Dams." This is a zone of minor seismic activity; therefore, further consideration of the seismic stability is not warranted.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

- a. Safety - Purdy Dam was found to be in fair overall condition at the time of inspection. Purdy Dam is a "Significant" hazard - "Small" size dam requiring a spillway capacity in the range of the 100-year flood to the 1/2 PMF. Because Purdy Dam is on the low end of the "Small" size category in terms of height and storage capacity, the 100-year flood was chosen as the SDF. As presented in Section 5, the spillway and reservoir are not capable of passing the 100-year flood without overtopping the dam. During the 100-year flood, the dam is overtopped by a maximum depth of 4.32 feet for a total duration of 40.83 hours. Therefore, the spillway is considered "Inadequate."
- b. Adequacy of Information - The information available and the observations made during the visual inspection are considered sufficient for a Phase I Inspection Report.
- c. Urgency - The owner should immediately initiate the further evaluation discussed in paragraph 7.1.d.
- d. Necessity for Additional Data/Evaluation - The hydraulic/hydrologic analysis performed in connection with this Phase I Inspection Report has indicated the need for additional spillway capacity. It is recommended that the owner immediately initiate an engineering study to further evaluate the spillway capacity and develop recommendations for remedial measures to reduce the overtopping potential of the dam.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

The inspection revealed certain items of remedial work which should be performed by the owner without delay. Item 1 below should be completed by a qualified professional engineer experienced in the design of hydraulic structures for dams. These include:

- 1) Initiate an engineering study to further evaluate the spillway capacity and develop recommendations for remedial measures to reduce the overtopping potential of the dam.

- 2) Fill the erosion gully at the right downstream abutment of the dam and reseed the area.
- 3) Remove the debris and silt at the entrance to the spillway.
- 4) Provide means to draw down reservoir during an emergency.

In addition, the following operational measures are recommended to be undertaken by the owner:

- 1) Develop a detailed emergency operation and warning system.
- 2) During periods of unusually heavy rain, provide around-the-clock surveillance of the dam.
- 3) When warning of a storm of major proportions is given by the National Weather Service, activate the emergency operation and warning system.

It is further recommended that formal inspection, maintenance, and operation procedures and records be developed and implemented. An emergency drawdown plan should be developed in case an emergency drawdown should become necessary. These should be included in a formal maintenance and operations manual for the dam.

APPENDIX A

**VISUAL INSPECTION CHECK LIST, FIELD SKETCH,
TOP OF DAM PROFILE, AND TYPICAL CROSS-SECTION**

A-1

Check List
Visual Inspection
Phase 1

Name of Dam Purdy (Stump Pond) Dam County Susquehanna State PA Coordinates Lat. N 41°51.7'
NDI # PA 00063
Pender #58-11

Date of Inspection 27 October 1980 Weather Partly Cloudy Temperature 40° F.

Pool Elevation at Time of Inspection 1409.0 ft.* M.S.L. Tailwater at Time of Inspection 1405.6 ft.* M.S.L.

*Assumed elevation from U.S.G.S. 7.5 minute topographic quadrangle, Harford, Pennsylvania.

Inspection Personnel:

Michael Baker Jr., Inc.:

James G. Ulinski
Wayne D. Lasch
Jeffrey S. Maze

Owner's Representatives:

Mr. E. Grindall
Charles J. Rupert
Pennsylvania Fish Commission,
Division of Fisheries and
Engineering

James G. Ulinski _____ Recorder

MASONRY DAMS

Name of Dam: PURDY DAM
NDI # PA 00063

VISUAL EXAMINATION OF		OBSERVATIONS	REMARKS OR RECOMMENDATIONS
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Slight erosion along right downstream abutment.		Fill in gully and seed area.
DRAINS	None observed		
WATER PASSAGES	None observed		
FOUNDATION	No problems observed		

MASONRY DAMS

Name of Dam:	PURDY DAM	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
NDI #	PA 00063		
VISUAL EXAMINATION OF CONCRETE SURFACES	SURFACE CRACKS CONCRETE SURFACES	None observed	
	STRUCTURAL CRACKING	None observed	
	VERTICAL AND HORIZONTAL ALIGNMENT	No problems observed	
	MONOLITH JOINTS	Not Applicable	
	CONSTRUCTION JOINTS	Not Applicable	

A-4

EMBANKMENT - Not Applicable

Name of Dam PURDY DAM

NDI # PA 00063

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

SURFACE CRACKS

UNUSUAL MOVEMENT OR
CRACKING AT OR BEYOND
THE TOE

SLOUGHING OR EROSION OF
EMBANKMENT AND ABUTMENT
SLOPES

EMBANKMENT - Not Applicable

Name of Dam	PURDY DAM	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
NDI #	PA 00063		
VISUAL EXAMINATION OF	VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST		

RIPRAP FAILURES

A-6

EMBANKMENT - Not Applicable

Name of Dam	PURDY DAM	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
NDI #	PA 00063		
VISUAL EXAMINATION OF	JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM		
		ANY NOTICEABLE SEEPAGE	
			STAFF GAGE AND RECORDER
			DRAINS

OUTLET WORKS - Not Applicable

Name of Dam: PURDY DAM
NDI # PA 00063

VISUAL EXAMINATION OFOBSERVATIONS

**CRACKING AND SPALLING OF
CONCRETE SURFACES IN
OUTLET CONDUIT**

INTAKE STRUCTURE

OUTLET STRUCTURE

OUTLET CHANNEL

EMERGENCY GATE

REMARKS OR RECOMMENDATIONS

UNGATED SPILLWAY

Name of Dam: PURDY DAM

NDI # PA 00063

VISUAL EXAMINATION OF**CONCRETE WEIR** Not Applicable**OBSERVATIONS**

APPROACH CHANNEL Accumulation of debris and sediment. Remove debris and sediment.

DISCHARGE CHANNEL Good condition.

BRIDGE AND PIERS None observed

Name of Dam: PURDY DAM

NDI # PA 00063

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

CONCRETE SILL

APPROACH CHANNEL

DISCHARGE CHANNEL

BRIDGE AND PIERS

GATES AND OPERATION
EQUIPMENT

INSTRUMENTATION	
Name of Dam: PURDY DAM	
NDI # PA 00063	
VISUAL EXAMINATION	OBSERVATIONS
MONUMENTATION/SURVEYS	None observed
OBSERVATION WELLS	None observed
WEIRS	None observed
PIEZOMETERS	None observed
OTHER	

RESERVOIR			
Name of Dam:	PURDY DAM	NDI #	PA 00063
VISUAL EXAMINATION OF			
SLOPES	The reservoir slopes are gentle to moderate with no signs of instability. PA Route 492 is on the right reservoir shoreline.	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEDIMENTATION	The upper fifth of the reservoir is silted in. This sedimentation problem should not significantly affect the performance of the dam and reservoir during flood events.		
UPSTREAM DAMS		1) Page's Lake Dam (NDI # PA 00062, PennDER # 58-5) is upstream of Purdy Dam. A Phase I Inspection Report is being prepared by Michael Baker, Jr., Inc. currently with this inspection report.	
		2) Fuller's Lake Dam (NDI # PA 00073, PennDER # 58-121) is located upstream of both Purdy Dam and Page's Lake Dam. A Phase I Inspection Report for this dam is also in the process of preparation.	

DOWNSTREAM CHANNEL

Name of Dam: PURDY DAM
NDI # PA 00063

VISUAL EXAMINATION OF

OBSERVATIONS

REMARKS OR RECOMMENDATIONS

CONDITION
(OBSTRUCTIONS,
DEBRIS, ETC.)

Some vegetation is present in the downstream channel but no debris or blockages are present.

SLOPES

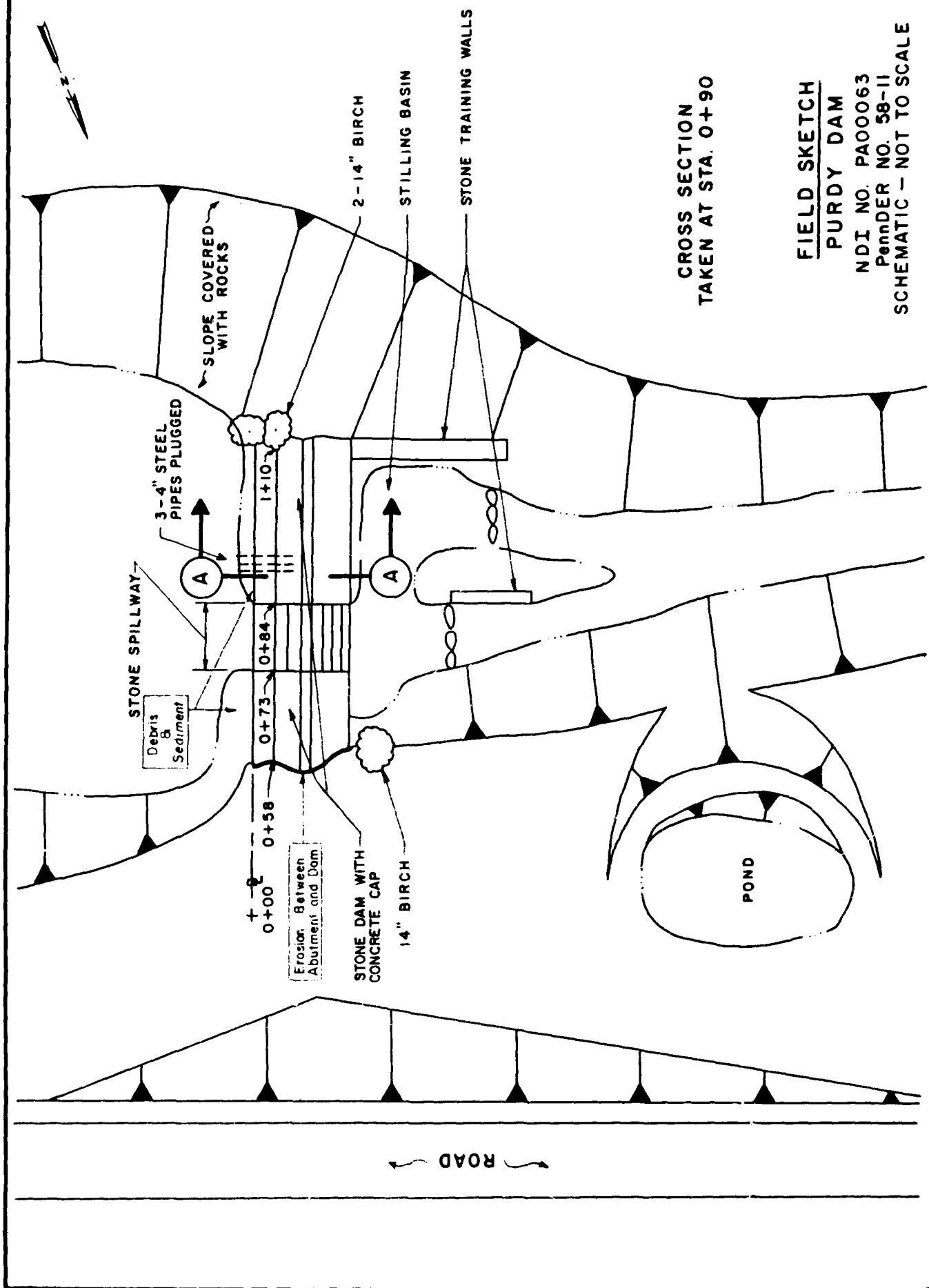
The downstream channel slope is moderate.
The side slopes are well-vegetated and no problems were observed.

APPROXIMATE NO.
OF HOMES AND
POPULATION

A bridge carrying PA Route 492 over the channel is located downstream. This bridge has an opening 13 ft. wide by 5 ft. high. One trailer and 2 homes are located downstream of this bridge.

FIELD SKETCH
PURDY DAM
NDI NO. PA00063
Pond No. 58-II
SCHEMATIC - NOT TO SCALE

CROSS SECTION
TAKEN AT STA. 0+90

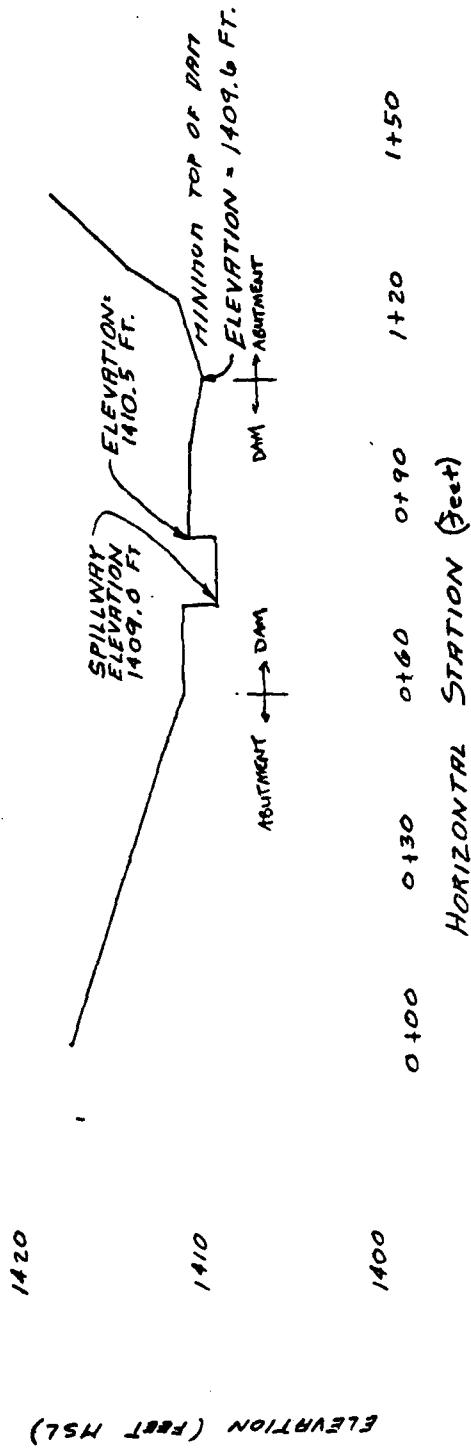
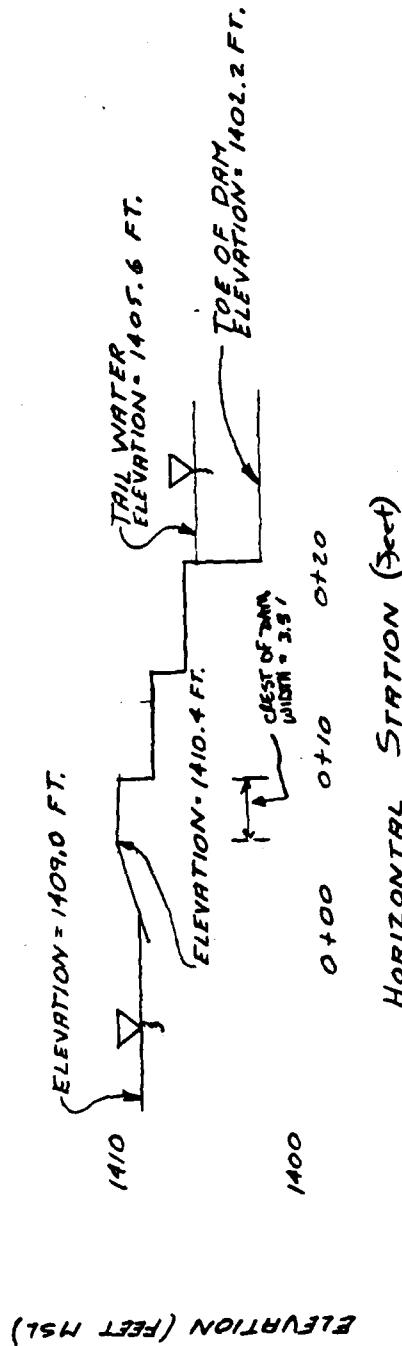


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THE BAKER ENGINEERS
Box 280
Beaver, Pa. 15009

PURDY (STUMP POND) DAM

TOP OF DAM PROFILE
TYPICAL CROSS-SECTION

DATE OF INSPECTION: 27 October 1980

Top of Dam Profile (looking upstream)Typical Cross Section

APPENDIX B

ENGINEERING DATA CHECK LIST

CHECK LIST
 ENGINEERING DATA
 DESIGN, CONSTRUCTION, OPERATION

Name of Dam: PURDY DAM
 NDI # PA 00063
 ITEM

REMARKS
 PLAN OF DAM None available

REGIONAL VICINITY MAP A USGS 7.5 minute topographic quadrangle, Harford, Pennsylvania, was used to prepare the vicinity map which is enclosed in this report as the Location Plan (Plate 1).

CONSTRUCTION HISTORY No dates or construction history is known.

TYPICAL SECTIONS OF DAM No information available

HYDROLOGIC/HYDRAULIC DATA No information available

OUTLETS - PLAN
 - DETAILS No information available
 - CONSTRAINTS No information available
 - DISCHARGE RATINGS No information available

RAINFALL/RESERVOIR RECORDS None available

Name of Dam:	PURDY DAM	
NDI #	PA 00063	
ITEM	REMARKS	
DESIGN REPORTS	No information available	
GEOLOGY REPORTS	No information available. The regional geology is presented as Appendix F of this report.	
DESIGN COMPUTATIONS	No information available	
HYDROLOGY & HYDRAULICS		
DAM STABILITY		
SEEPAGE STUDIES		
MATERIALS INVESTIGATIONS	No information available	
BORING RECORDS		
LABORATORY		
FIELD		
POST-CONSTRUCTION SURVEYS OF DAM	None	
BORROW SOURCES	No information available	

Name of Dam:	PURDY DAM
NDI #	PA 00063
ITEM	REMARKS
MODIFICATIONS	Dam was reconstructed in 1939 by the Susquehanna Sportsmen's Association
HIGH POOL RECORDS	No information available
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	No detailed engineering report other than the 22 May 1920 Water Supply Commission Inspection is available. A number of inspection reports are available in the PennDER file, including the latest recorded inspection on 15 October 1965 by PennDER.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None reported in the information available.
MAINTENANCE OPERATION RECORDS	Formal records of maintenance are kept by the Pennsylvania Fish Commission.

Name of Dam: PURDY DAM

NDI # PA 00063

B-4

ITEM	REMARKS
SPILLWAY PLAN, SECTIONS, and DETAILS	No information available
OPERATING EQUIPMENT PLANS & DETAILS	No information available

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 6.63 sq.mi., mild to steep slopes
with wooded areas.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1409.0 ft.
(54 ac.-ft.)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1409.6 ft.
(62 ac.-ft.)

ELEVATION MAXIMUM DESIGN POOL: Unknown

ELEVATION TOP DAM: 1409.6 ft. (minimum crest elevation)

SPILLWAY:

- a. Crest Elevation 1409.0 ft.
- b. Type Broad crested masonry weir
- c. Width of Crest Parallel to Flow 3.5 ft.
- d. Length of Crest Perpendicular to Flow 11 ft.
- e. Location Spillover Center of dam
- f. Number and Type of Gates None

OUTLET WORKS: None

- a. Type
- b. Location
- c. Entrance Inverts
- d. Exit Inverts
- e. Emergency Drawdown Facilities

HYDROMETEOROLOGICAL GAGES: None

- a. Type
- b. Location
- c. Records

MAXIMUM NON-DAMAGING DISCHARGE 115 c.f.s.

APPENDIX C

PHOTOGRAPH LOCATION PLAN AND PHOTOGRAPHS

DETAILED PHOTOGRAPH DESCRIPTIONS

Overall View of Dam

Photograph Location Plan

Photo 1 - View of Upstream Side of Dam from Right Shoreline

Photo 2 - View of Upstream Side of Dam from Left Shoreline

Photo 3 - View Across Crest of Dam from Right Abutment

Photo 4 - View of Downstream Side of Dam from Left Abutment

Photo 5 - View of Right Abutment

Photo 6 - Eroded Area of Right Abutment

Note: Photographs were taken on 27 October 1980.

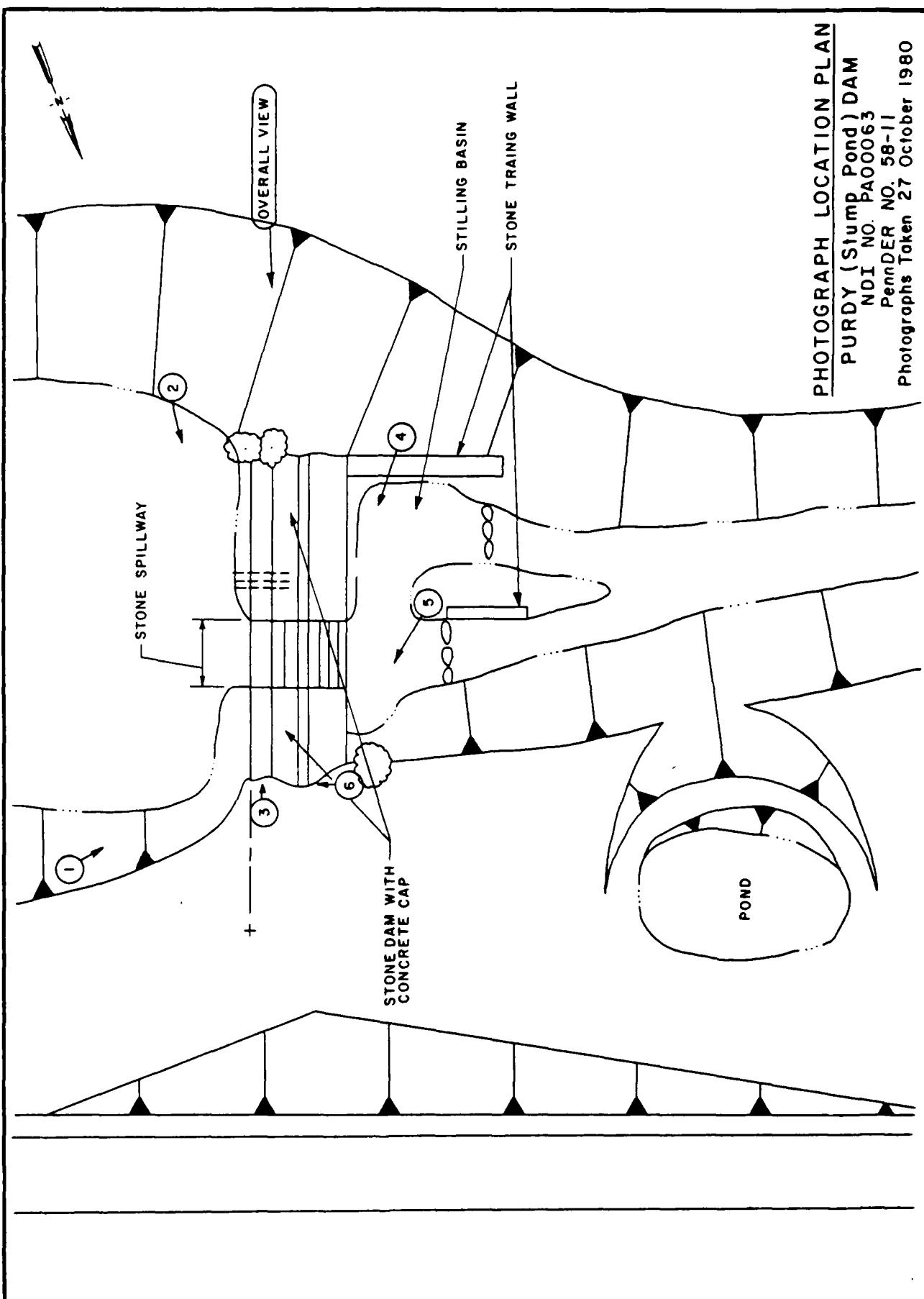
PHOTOGRAPH LOCATION PLAN

PURDY (Stump Pond) DAM

NDI NO. PA00063

PennDER NO. 58-11

Photographs Taken 27 October 1980



PURDY (STUMP POND) DAM



PHOTO 1. View of Upstream Side of Dam from Right Shoreline



PHOTO 2. View of Upstream Side of Dam from Left Shoreline

PURDY (STUMP POND) DAM

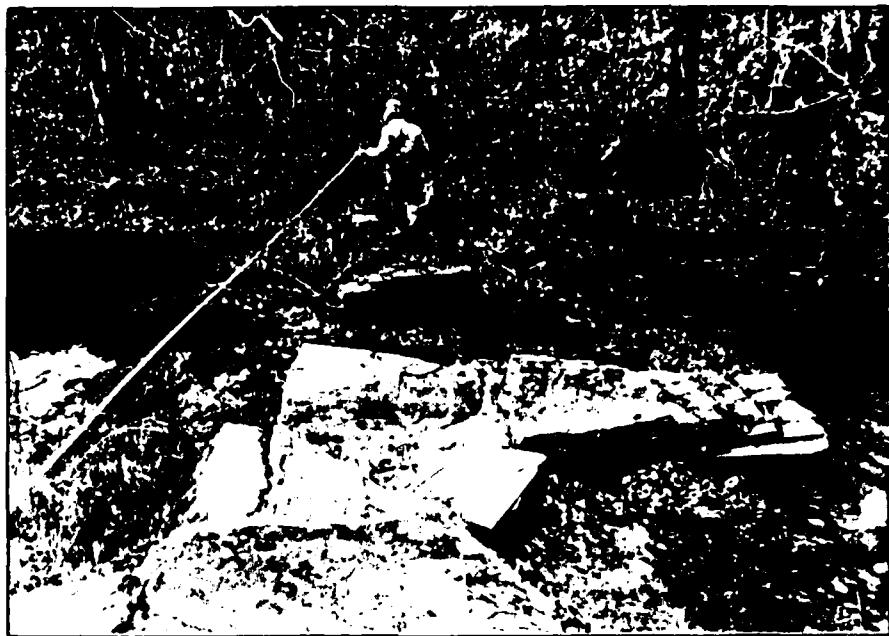


PHOTO 3. View Across Crest of Dam from Right Abutment



PHOTO 4. View of Downstream Side of Dam from Left Abutment

PURDY (STUMP POND) DAM

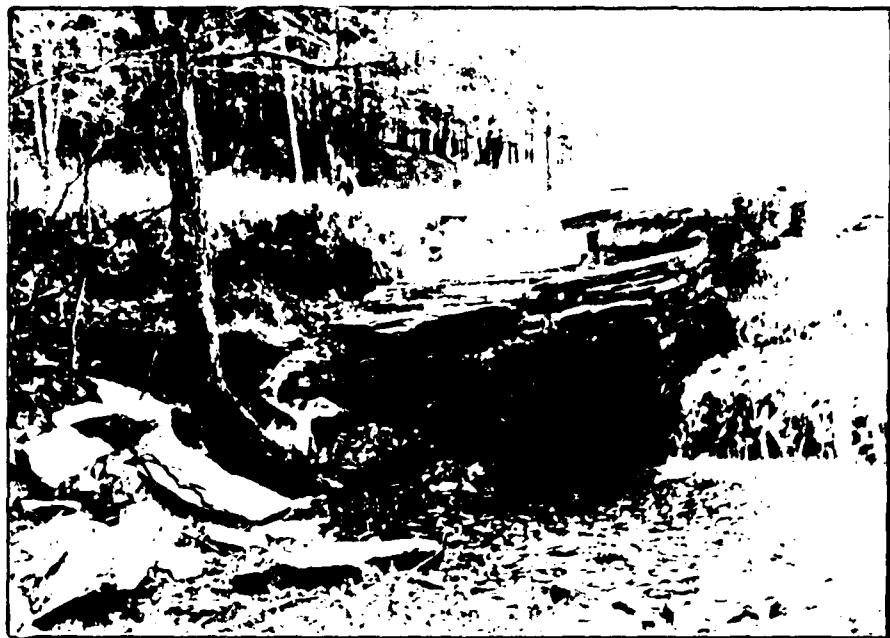


PHOTO 5. View of Right Abutment



PHOTO 6. Eroded Area of Right Abutment

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

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Box 280
Beaver, Pa. 15009

Subject PURDY DAM S.O. No. _____
APPENDIX D - HYDROLOGIC AND Sheet No. _____ of _____
HYDRAULIC COMPUTATIONS Drawing No. _____
Computed by _____ Checked by _____ Date _____

<u>SUBJECT</u>	<u>PAGE</u>
PREFACE	6
HYDROLOGY AND HYDRAULIC DATA BASE	1
HYDRAULIC DATA	2
DRAINAGE AREA AND CENTROID MAP	3
TOP OF DAM PROFILE AND CROSS SECTION	4
SPILLWAY DISCHARGE RATING	5
100-YEAR STORM DISTRIBUTION	6
100-YEAR DISCHARGE CALCULATION	7
ROUTING SUMMARY	10
HEC-1 CAPACITY ANALYSIS	11

PREFACE

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

The conclusions presented pertain to present conditions, and the effect of future development on the hydrology has not been considered.

HYDROLOGIC AND HYDRAULIC ANALYSIS
LAKE DAM

NAME OF DAM: PURDY DAM

100-YEAR STORM • 120 INCHES IN 24 HOURS *

STATION	1	2	3	4
Station Description	FULLER'S LAKE DAM N.Y. & PA. 00073	PAGE'S LAKE DAM N.Y. & PA. 00062	PURDY DAM N.Y. & PA. 00061	
Drainage Area (square miles)	0.95	1.85	1.85	
Cumulative Drainage Area (square miles)	0.95	4.78	6.63	
Adjustment of PMF for Drainage Area (%) ⁽¹⁾				
6 Hours	100-YEAR STORM DISTRIBUTION ON SHEET 6	100-YEAR STORM DISTRIBUTION ON SHEET 6	100-YEAR STORM DISTRIBUTION ON SHEET 6	
12 Hours				
24 Hours				
48 hours				
72 hours				
SCS Dimensionless Unit Hydrograph Parameters	$T_c = 1.36 \text{ hr.}$	$T_c = 2.07 \text{ hr.}$	$T_c = 1.32 \text{ hr.}$	
	Lag Time = .82 hr.	Lag Time = 1.24 hr.	Lag Time = 0.79 hr.	
	CN = 70	CN = 64	CN = 71	
Spillway Data				
Crest Length (ft)	TRAPEZOIDAL SPILLWAY	SPILLWAY RATING	SPILLWAY	
Freeboard (ft)	RATING CURVE TAKEN	CURVE TAKEN	RATING CURVE	
Discharge Coefficient Exponent	FROM FULLER'S LAKE DAM INSPECTION REPORT	FROM PAGE'S LAKE DAM INSPEC- TION REPORT	DEVELOPED ON SHEET 5	

(1) Technical Paper No. 40, Cooperative Studies Section, U.S. Weather Bureau, Washington, D.C., 1961.

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MICHAEL BAKER ENGINEERS

Success

PA

S.C.N.

Sheet No. 2 of 23

Drawing No.

Date 2-2-62

W.C. 28
Dams & Levees - 1962

Subject

417 - Check Dam

Topographic Survey

Topographic Survey made by Michael Baker Jr. Inc. 2-2-62.

Surveyed by D. C. H. - DCP

200	34
200	32
200	31

Topographic Survey

Surveyed by D. C. H. - DCP

1. SURFACE ELEVATION, ETC. - 42 FT.
2. SURFACE AREA OF 100 X 100 = 100 SQ. FT.
3. SURFACE AREA OF 100 X 100 = 100 SQ. FT.
ESTIMATED FROM SURVEYS, ETC.
AND SURFACE AREA.

$$\text{TOTAL SURFACE AREA} = 100 \times 100 = 10,000 \text{ SQ. FT.}$$
$$10,000 \times 100 = 1,000,000 \text{ CUBIC FT.}$$
$$1,000,000 \times 0.000001 = 1 \text{ CUBIC YARD.}$$

Top of Dam Storage

82 40-FT. FROM H.E.C. - 4000 S.

Surveillance Hydrometer

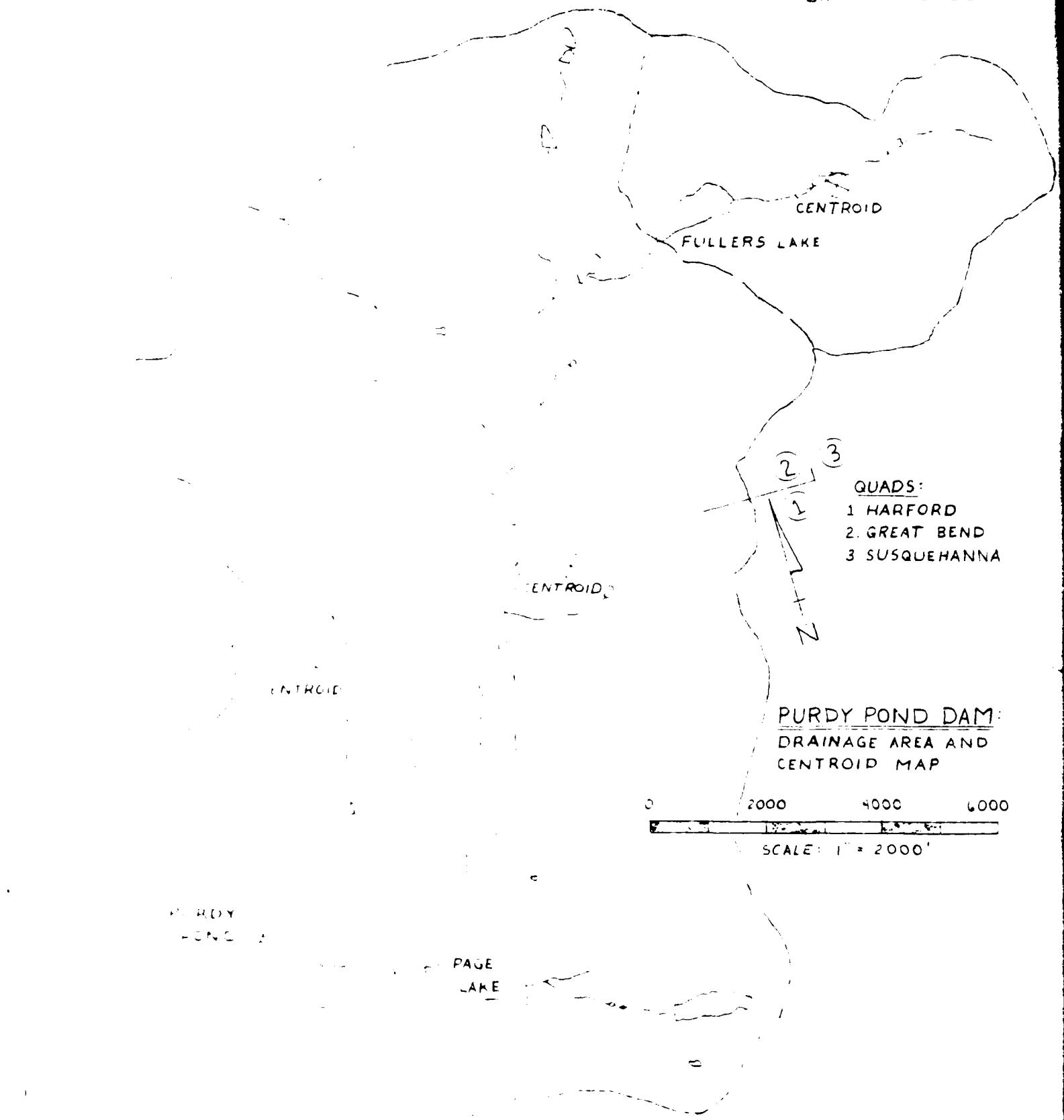
$$L = 299.17, \quad L_{ca} = 126.12$$

WATERSHED IS IN ZONE 1 R

$$C_r = 1.50, \quad C_p = 0.62$$

$$T_p = 1.50 (L + L_{ca})^{0.5} = 2.28$$

Drainage Area Above Dam - 6.63 Sq. M.



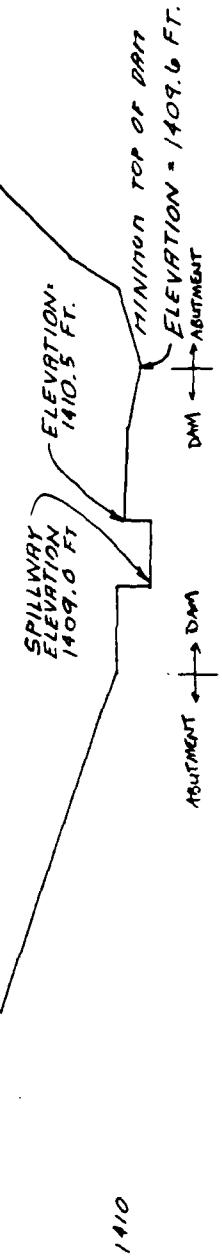
MICHAEL BAKER, JR., INC.

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Beaver, Pa. 15009

Top Of Dam Profile (Looking upstream)

1420



ELEVATION (FEET MSL)

Subject PURDY DAM

S.O. No. 13837-00-PA-A-0

TOP OF DAM PROFILE

Sheet No. 4 of 23

TYPICAL CROSS SECTION

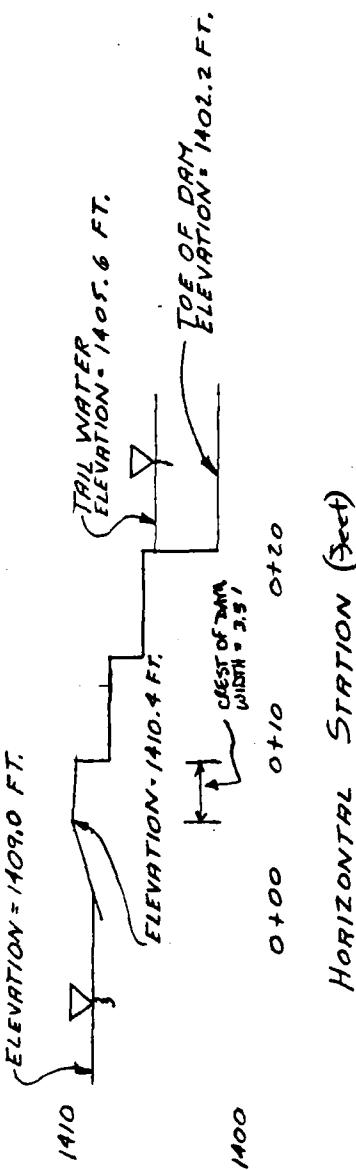
Drawing No. _____

Computed by GWT

Checked by WDL

Date 11-17-80

TYPICAL CROSS SECTION



ELEVATION (FEET MSL)

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Subject PURDY DAM

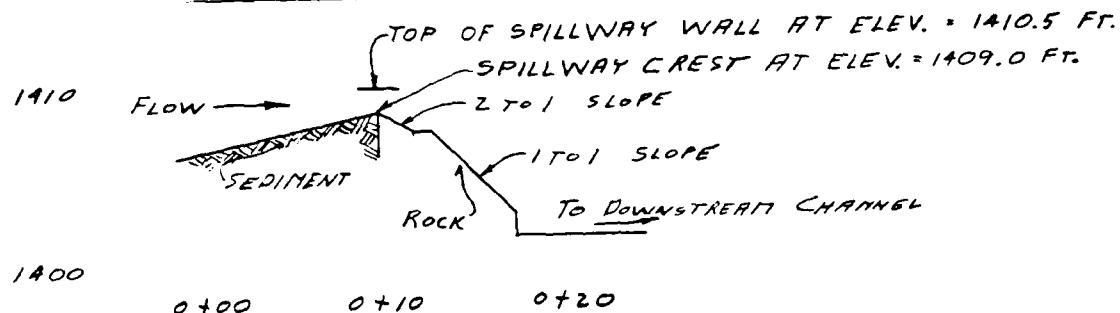
S.O. No. 13837-00-ARA-04

SPILLWAY DISCHARGE RATING

Sheet No. 5 of 23

Drawing No. _____

Computed by GWT Checked by WDL Date 11-20-80

SPILLWAY PROFILE

DEVELOP RATING CURVE BASED UPON CRITICAL FLOW OVER SPILLWAY:

$$V = \sqrt{g D} \quad (\text{CHOW, OPEN CHANNEL HYDRAULICS, P. 43})$$

$$g = 32.2 \text{ FT/SEC.}^2$$

$$D = \text{MEAN HYDRAULIC DEPTH} = \frac{\text{FLOW AREA}}{\text{FREE SURFACE TOP WIDTH}} = \frac{A}{T}$$

V = MEAN FLOW VELOCITY

$$Q = RV$$

ELEV., FT.	FLOW DEPTH, FT.	AREA, FT. ²	TOPWIDTH, FT.	B.F.	V, FT./SEC.	Q, CFS	$\frac{V^2}{2g}$	EGL, FT.
1409.0	0	0	0	0	0	0	0	1409.0
1409.5	0.5	5.5	11	.5	4.01	22.06	0.25	1409.75
1410.0	1.0	11.0	11	1.0	5.67	62.37	0.50	1410.50
1410.5	1.5	16.5	11	1.5	6.95	114.67	0.75	1411.25
1411.0	2.0	22.0	11	2.0	8.03	176.66	1.00	1412.00
1411.5	2.5	27.5	11	2.5	8.97	246.67	1.25	1412.75
1412.0	3.0	33.0	11	3.0	9.83	324.34	1.50	1413.50
1412.5	4.0	44.0	11	4.0	11.35	499.40	2.00	1415.00
1413.0	5.0	55.0	11	5.0	12.69	697.87	2.50	1416.50

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Subject PURDY DAM

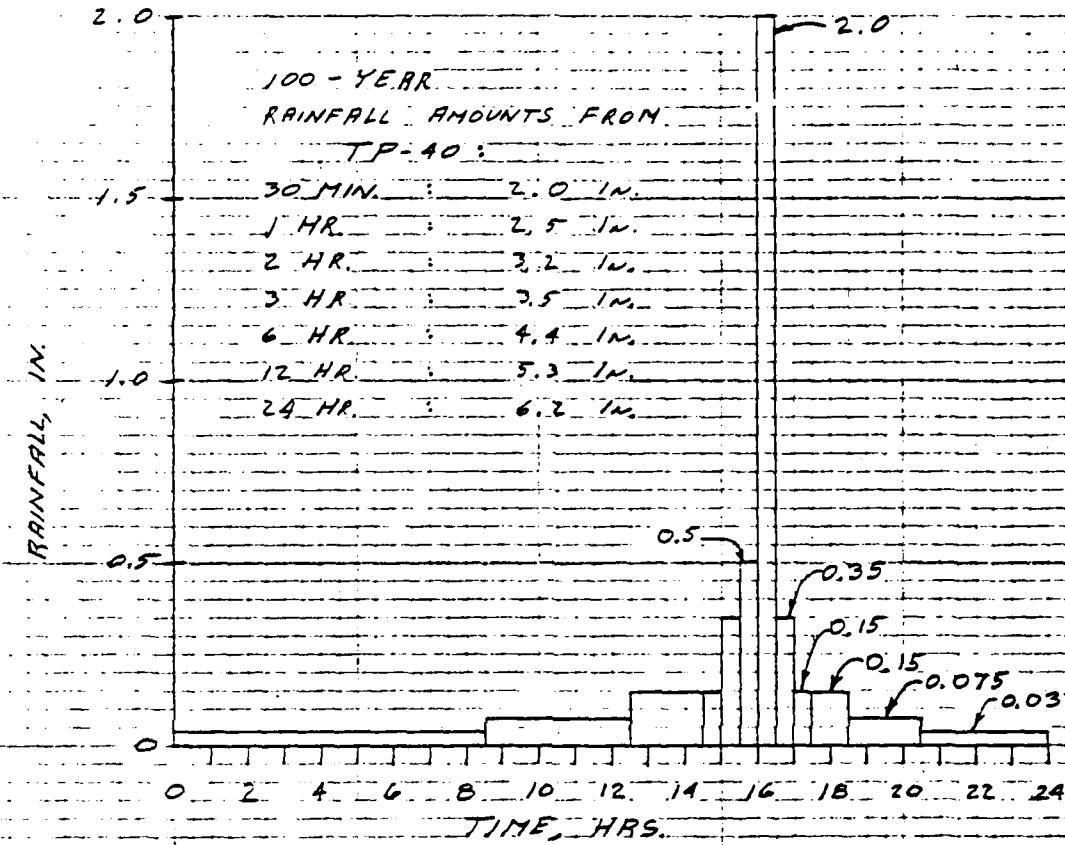
S.O. No.

100 - YEAR STORM DISTRIBUTION Sheet No. 10 of 23

Drawing No.

Computed by GUYT Checked by WDC

Date 11-25-80



RAINFALL DISTRIBUTION
(30 MINUTE INTERVALS)

INTERVAL NUMBERS	% TOTAL RF OCCURRING IN EACH INTERVAL
1 - 17	0.6
18 - 25	1.2
26 - 29	2.4
30	2.5
31	5.7
32	8.1
33	32.3
34	5.7
35	2.5
36 - 37	2.4
38 - 41	1.2
42 - 48	0.6
	TOTAL = 100%

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Subject PURDY DAM S.O. No. _____
100-YEAR DISCHARGE CALCULATION Sheet No. 7 of 23
Drawing No. _____
Computed by GWT Checked by WNL Date 11-26-80

THE INFLOW TO THE IMPOUNDMENT FOR THE 100-YEAR FLOOD WAS CALCULATED USING MATERIAL FROM "THE HYDROLOGIC STUDY - TROPICAL STORM AGNES" PREPARED BY THE SPECIAL STUDIES BRANCH, PLANNING DIVISION, NORTH ATLANTIC DIVISION, CORPS OF ENGINEERS, IN NEW YORK CITY.

DRAINAGE AREA - 1.85 SQ. MI.

① COMPUTE THE MEAN LOGARITHM

$$\log(Q_m) = C_m + 0.75 \log A$$

$\log(Q_m)$ = MEAN LOGARITHM OF ANNUAL FLOOD PEAKS

A = DRAINAGE AREA, SQ. MI., = 1.85 SQ. MI.

C_m = MAP COEFFICIENT FOR MEAN LOG OF ANNUAL PEAKS FROM FIG. 21 = 2.16

$$\begin{aligned}\log(Q_m) &= 2.16 + 0.75(\log 1.85) \\ &= 2.360\end{aligned}$$

② COMPUTE STANDARD DEVIATION

$$s = C_s - 0.05(\log A)$$

s = STANDARD DEVIATION OF THE LOGARITHMS OF THE ANNUAL PEAKS.

C_s = MAP COEFFICIENT FOR STANDARD DEVIATION FROM FIG. 22 = 0.35

A = DRAINAGE AREA, SQ. MI. = 1.85 SQ. MI.

$$\begin{aligned}s &= C_s - 0.05(\log A) \\ &= 0.35 - 0.05(\log 1.85) \\ &= 0.337\end{aligned}$$

③ SELECT SKEW COEFFICIENT FROM FIG. 23 = 0.23

④ $\log(Q_{100}) = \log(Q_m) + K(P_g)s$

$K(P_g)$ = STANDARD DEVIATE FOR A GIVEN EXCEEDENCE FREQUENCY PERCENTAGE (P) AND SKEW COEFFICIENT (g) FROM EXHIBIT 39 OF BEARD'S "STATISTICAL METHODS IN HYDROLOGY"

$$\begin{aligned}\log(Q_{100}) &= \log(Q_m) + K(P_g)s \\ &= 2.360 + 2.50(0.337) \\ Q_{100} &= 1,595 \text{ CFS}\end{aligned}$$

USING ZERO LOSS RATES, A PEAK FLOW OF 1170 CFS WAS OBTAINED IN THE HEC-1 ANALYSIS IF THE SNYDERS UNIT HYDROGRAPH PARAMETERS ORIGINALLY DERIVED FOR THIS BASIN WERE USED.

MICHAEL BAKER, JR., INC.

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Subject PULY. DAM S.O. No. _____
100 - YEAR DISCHARGE Sheet No. 8 of 23
CALCULATIONS (CONTINUED) Drawing No. _____
Computed by GWT Checked by WDL Date 12-1-80

THE 100-YEAR HYDROGRAPH IS THEREFORE COMPUTED USING THE SCS DIMENSIONLESS UNIT HYDROGRAPH APPROACH. TIME OF CONCENTRATION AND LAG TIME ARE COMPUTED AS FOLLOWS:

$$T_c = \text{TIME OF CONCENTRATION} = \frac{\text{OVERLAND FLOW TIME} + \text{CHANNEL FLOW TIME}}{}$$

OVERLAND FLOW TIME:

$$\text{DISTANCE} = 4950 \text{ FT.}$$

$$\text{SLOPE} = \frac{1800 - 1420}{4950} = 7.7\%$$

$$\text{AVERAGE FLOW VELOCITY} = 0.70 \text{ FT./SEC.}$$

(FROM FIG. 3.1, T.R. NO. 55, URBAN HYDROLOGY FOR SMALL WATERSHEDS, SCS.)

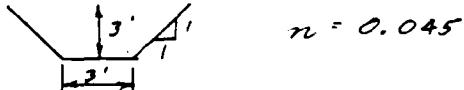
$$\text{TRAVEL TIME} = 7071 \text{ SEC.}$$

CHANNEL FLOW TIME

$$\text{DISTANCE} = 2050 \text{ FT.}$$

$$\text{SLOPE} = \frac{1720 - 1410}{2050} = 0.49\%$$

ASSUME AVERAGE CHANNEL SIZE IS:



$$n = 0.045$$

$$\text{AVERAGE FLOW VELOCITY} = V = \frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$$
$$V = \frac{1.49}{0.045} \left(\frac{(3+2)3}{3+6\sqrt{1.49}} \right)^{\frac{2}{3}} (0.0049)^{\frac{1}{2}}$$

$$V = 2.03 \text{ FT/SEC.}$$

$$\text{TRAVEL TIME} = 1010 \text{ SEC.}$$

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Subject PUPPY DPM S.O. No. _____
100-YEAR DISCHARGE Sheet No. 9 of 23
CALCULATIONS (CONTINUED) Drawing No. _____
Computed by GWT Checked by WDL Date 12-1-80

$$\text{TOTAL TRAVEL TIME} = T_c = 7071 + 1010 = 8081 \text{ SEC.} \\ = 2.24 \text{ HR.}$$

$$\text{LAG TIME} = 0.6 T_c = 1.35 \text{ HR.}$$

WITH THE SCS PROCEDURE, A CURVE NUMBER OF 68 PRODUCED A PEAK FLOW OF 1580 CFS THIS VALUE IS WITHIN 1 % OF THE PREVIOUSLY COMPUTED PEAK FLOW OF 1595.3 CFS AND IS WITHIN THE 10 % LIMIT SUGGESTED BY THE CORPS GUIDELINES.

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Box 280
Beaver, Pa. 15009

Subject PURDY DAM

S.O. No.

ROUTING SUMMARY

Sheet No. 10 of 23

Computed by GWT

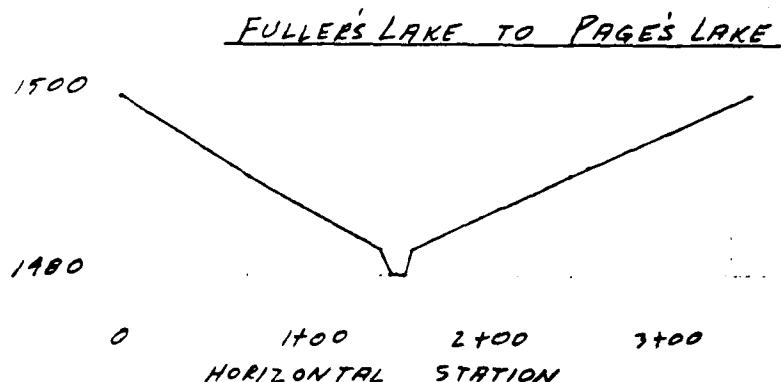
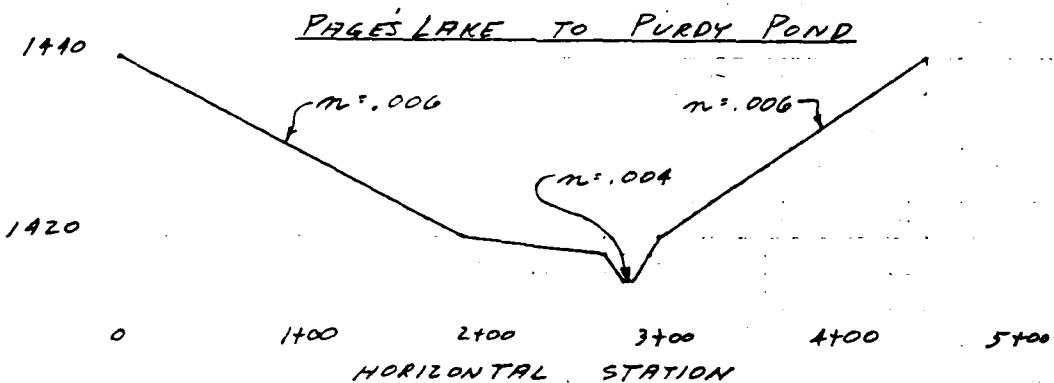
Checked by _____

Drawing No. _____

Date 1-20-81

NAME	LENGTH OF DAM	HEIGHT OF DAM	NORMAL POOL STORAGE	TOP OF DPM STORAGE	ROUTING LENGTH OF CHANNEL
PURDY POND	52 FT.	7.4 FT.	54.2 AC.-FT. 1409.0 FT.	62 AC.-FT. 1409.6 FT.	
PAGE LAKE	162 FT.	15 FT.	971.1 AC.-FT. 1433.0 FT.	1431 AC.-FT 1436.2 FT.	2050 FT.
FULLER LAKE	143 FT.	.9 FT.	60.7 AC.-FT. 1537.0 FT.	114 AC.-FT. 1539.6 FT.	9300 FT.

TYPICAL ROUTING CHANNELS



***** FLUJ HYDROGRAPH PACKAGE (FLUJ-1) *****
 DAM SAFETY VERSION — JULY 1973
 LAST MODIFICATION 26 FEB 79 100-Year Flow Routing
 48J UPDATE 04 JULY 79
 ***** NATIONAL PROGRAM FOR INSPECTION OF NON-FEUDAL JAMS *****
 ***** HYDRAULIC AND HYDRAULIC ANALYSIS OF PUNJAB JAM *****
 ***** UNIT HYDROGRAPH BY SNYDER'S METRUD *****
 1 A1
 2 A2
 3 A3
 4 B 4.3
 5 C 10.0
 6 D 0.0
 7 E 0.0
 8 F 0.0
 9 G 0.0
 10 H 0.0
 11 I 0.0
 12 J 0.003
 13 K 0.003
 14 L 0.012
 15 M 0.037
 16 N 0.012
 17 O 0.012
 18 P 0.012
 19 Q 0.012
 20 R 0.012
 21 S 0.012
 22 T 0.012
 23 U 0.012
 24 V 0.012
 25 W 0.012
 26 X 0.012
 27 Y 0.012
 28 Z 0.012
 29 AA 0.012
 30 BB 0.012
 31 CC 0.012
 32 DD 0.012
 33 EE 0.012
 34 FF 0.012
 35 GG 0.012
 36 HH 0.012
 37 II 0.012
 38 JJ 0.012
 39 KK 0.012
 40 LL 0.012
 41 MM 0.012
 42 NN 0.012
 43 OO 0.012
 44 PP 0.012
 45 RR 0.012
 46 TT 0.012
 47 UU 0.012
 48 VV 0.012
 49 WW 0.012
 50 XX 0.012

***** KUTTUF HYDROGRAPH TO DAM *****
 1 J 2 0.95
 2 J 3 6.2
 3 J 4 0.008
 4 J 5 0.008
 5 J 6 0.008
 6 J 7 0.008
 7 J 8 0.008
 8 J 9 0.008
 9 J 10 0.008
 10 J 11 0.008
 11 J 12 0.008
 12 J 13 0.008
 13 J 14 0.008
 14 J 15 0.008
 15 J 16 0.008
 16 J 17 0.008
 17 J 18 0.008
 18 J 19 0.008
 19 J 20 0.008
 20 J 21 0.008
 21 J 22 0.008
 22 J 23 0.008
 23 J 24 0.008
 24 J 25 0.008
 25 J 26 0.008
 26 J 27 0.008
 27 J 28 0.008
 28 J 29 0.008
 29 J 30 0.008
 30 J 31 0.008
 31 J 32 0.008
 32 J 33 0.008
 33 J 34 0.008
 34 J 35 0.008
 35 J 36 0.008
 36 J 37 0.008
 37 J 38 0.008
 38 J 39 0.008
 39 J 40 0.008
 40 J 41 0.008
 41 J 42 0.008
 42 J 43 0.008
 43 J 44 0.008
 44 J 45 0.008
 45 J 46 0.008
 46 J 47 0.008
 47 J 48 0.008
 48 J 49 0.008
 49 J 50 0.008

***** ADJUSTING FOR PULTERS LAKE DAM *****
 1 J 2 0.72
 2 J 3 2.0
 3 J 4 2.0
 4 J 5 2.0
 5 J 6 2.0
 6 J 7 2.0
 7 J 8 2.0
 8 J 9 2.0
 9 J 10 2.0
 10 J 11 2.0
 11 J 12 2.0
 12 J 13 2.0
 13 J 14 2.0
 14 J 15 2.0
 15 J 16 2.0
 16 J 17 2.0
 17 J 18 2.0
 18 J 19 2.0
 19 J 20 2.0
 20 J 21 2.0
 21 J 22 2.0
 22 J 23 2.0
 23 J 24 2.0
 24 J 25 2.0
 25 J 26 2.0
 26 J 27 2.0
 27 J 28 2.0
 28 J 29 2.0
 29 J 30 2.0
 30 J 31 2.0
 31 J 32 2.0
 32 J 33 2.0
 33 J 34 2.0
 34 J 35 2.0
 35 J 36 2.0
 36 J 37 2.0
 37 J 38 2.0
 38 J 39 2.0
 39 J 40 2.0
 40 J 41 2.0
 41 J 42 2.0
 42 J 43 2.0
 43 J 44 2.0
 44 J 45 2.0
 45 J 46 2.0
 46 J 47 2.0
 47 J 48 2.0
 48 J 49 2.0
 49 J 50 2.0

***** KUTTUF HYDROGRAPH TO PULTERS LAKE *****
 1 J 2 3.03
 2 J 3 6.2
 3 J 4 0.008
 4 J 5 0.008
 5 J 6 0.008
 6 J 7 0.008
 7 J 8 0.008
 8 J 9 0.008
 9 J 10 0.008
 10 J 11 0.008
 11 J 12 0.008
 12 J 13 0.008
 13 J 14 0.008
 14 J 15 0.008
 15 J 16 0.008
 16 J 17 0.008
 17 J 18 0.008
 18 J 19 0.008
 19 J 20 0.008
 20 J 21 0.008
 21 J 22 0.008
 22 J 23 0.008
 23 J 24 0.008
 24 J 25 0.008
 25 J 26 0.008
 26 J 27 0.008
 27 J 28 0.008
 28 J 29 0.008
 29 J 30 0.008
 30 J 31 0.008
 31 J 32 0.008
 32 J 33 0.008
 33 J 34 0.008
 34 J 35 0.008
 35 J 36 0.008
 36 J 37 0.008
 37 J 38 0.008
 38 J 39 0.008
 39 J 40 0.008
 40 J 41 0.008
 41 J 42 0.008
 42 J 43 0.008
 43 J 44 0.008
 44 J 45 0.008
 45 J 46 0.008
 46 J 47 0.008
 47 J 48 0.008
 48 J 49 0.008
 49 J 50 0.008

SHEET 11 OF 29

PREFACE OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TU	2
ROUTE HYDROGRAPH TU	3
RUNOFF HYDROGRAPH AT	4
RUNOFF HYDROGRAPH AT	5
CUMULATIVE 2 HYDROGRAPHS AT	5
ROUTE HYDROGRAPH TU	6
ROUTE HYDROGRAPH TU	7
RUNOFF HYDROGRAPH AT	8
CUMULATIVE 2 HYDROGRAPHS AT	9
ROUTE HYDROGRAPH TU	10
END OF NETWORK	

FLUID HYDROGRAPH PACKAGE (FLU-H)
 DAM SAFETY VERSION — JULY 1978
 LAST MODIFICATION 26 FEB 79
 48J UPDATE 04 JUN 79

RUN DATE 02/17/81
 TIME 15:54

NATIONAL PROGRAM FOR INSPECTION OF NON-DEFEKAL DAMS
HYDRAULIC AND HYDRAULIC ANALYSIS OF PUKUY DAM
JNTT HYDROGRAPH BY SNYERS METHOD

JOB SPECIFICATION	
NR	NAME
400	NHIN
	TUDAY
	THRN
	NETRC
	IPLT
	IPAT
	ASTAN
10	0
JODER	0
NWJ	LKUP1
	TKACE
5	0
	0
	0
	0

MULTI-PLAN ANALYSES TO BE PERFORMED
 NPLAN= 1 NWIIU= 1 LKIIU= 1

RFLIS= 1.00

SUB-AREA RUNOFF COMPUTATION

RJNLF HYDROGRAPH TO DAM

STAG		ICURP	IECON	ITAPE	IPLT	IPAT	INAME	ISTAGE	IAUW
1	0	0	0	0	0	0	0	0	0

IHYDG	IJHG	ITREA	SNAP	HYDROGRAPH DATA	KAFIU	ISHNU	ISAMT	LULAL
0	2	0.95	0.0	0.95	0.0	0.0	0	0

LRQPT	SIKKR	ULTRK	RTOL	ECHAIN	SINKS	KILUK	SIRIL	UNSL	ALSMK	KLIMP
0	0.0	0.0	0.0	0.0	0.0	0.0	-1.00	-70.00	0.0	0.0

CURVE .4J = -70.00 WEINSS = -1.00 RTTLI CN = 70.00

FC	UNIT HYDROGRAPH DATA
0.0	LAU= 0.82

RECEDITION DATA
 SRTQ= -1.50 QRCSN= -0.05 RIJW= 2.00

0.0.JA	MR.HN	PERIJU	RAIN	EXCS	LUSS	END-OF-PERIOD FLUM	HU.UA	HK.HM	PERIJU	RAIN	EXCS	LUSS	LUMP J

SUM	0.20	2.90	2.24	1.224
	157.11	75.71	82.11	326.12

SHEET 14 OF 23

HYDROGRAPH ROUTING

ROUTER FOR FULLERS LAKE DAM

	ISTAG	TCOMP	TEUN	ITAPL	JPLI	IPRI	INAME	IAJAT	IADU
	2	1	0	0	0	0	0	0	0
ROUTING DATA									
ILUS\$,	CLOSS	AVL	RES	ISAME	IUP1	IPMP	LSTR		
0.J	0.J	0.0	1	1	0	0	0		
STAGE	1537.00	1537.00	1538.30	1539.00	1539.00	1540.20	1540.30		
FLOW	0.0	29.0	100.30	224.70	370.80	635.30	677.10		
SURFACE AREA	14.	17.	26.	39.					
CAPACITY	0.	61.	124.	162.					
ELEVATION	1537.	1537.	1540.	1560.					
WREL	SPWUD	COWD	EWWD	ELWL	GWUL	GWLA	EWPL		
1537.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

	WREL	SPWUD	COWD	EWWD	ELWL	GWUL	GWLA	EWPL	DAM DATA
	1537.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CREST LENGTH	0.								
AT OR BELOW	1539.								
ELEVATION	1539.0	1540.0	1540.5	1541.0	1541.5	1542.0	1542.5	1543.0	
PEAK OUTFLW IS	631.	AT 114E	7.00 HOURS						

HYDROGRAPH ROUTING

ROUTER CHANNEL TO PAGE LANE

	ISTAG	TCOMP	TEUN	ITAPL	JPLI	IPRI	INAME	IAJAT	IADU
	3	1	0	0	0	0	0	0	0
ROUTING DATA									
ILUS\$,	CLOSS	AVG	RES	ISAME	IUP1	IPMP	LSTR		
0.J	0.J	0.0	1	1	0	0	0		
STAGE	1	0	0	0.0	0.0	0.0	0.0		
FLOW	Q411	Q412	Q413	ELIV1	BLMAX	RJTH	SEL		
	0.7000	1.0400	0.1100	1433.0	1533.0	9300.	0.01300		

WATER LEVEL CHANNEL ROUTING

Q411 Q412 Q413 ELIV1 BLMAX RJTH SEL
 0.7000 1.0400 0.1100 1433.0 1533.0 9300. 0.01300

SHEET 15 OF 23

HYDROGRAPH ROUTING

RJJIJIS PURYU DAM

	I STATUS	I CUMP	I ECUN	I TAPL	J PFLT	J NAME	I STATUS	I AULU
ALBS,	10	1	0	0	0	0	1	0
LLOSS	0.0	0.0	ROUTING DATA	0	0	0	0	0
U.J	0.0	0.0	IKES ISAM	1	0	0	0	0
IPS	65 IPS	NSTUL	LAG	IPMP	LSIR			
STATE	1.09.00	1.09.70	1.10.50	1.11.30	1.12.00	1.13.70	1.14.50	1.15.70
FLOW	0.0	22.10	62.50	116.70	176.70	246.70	316.70	386.70
SURFACE AREA=	11.	12.	39.	69.				
CAPACITY=	0.	54.	318.	1378.				
ELEVATION=	1404.	1409.	1420.	1430.				

REL SPWLD CQW EXPW ELEV LQWL LQRL LAPL

1709.0 0.0 0.0 0.0 0.0 0.0 0.0

TOPEL TUQD EXPJ UAHWD

1409.6 3.1 4.5 6.6

DAM DATA

CREST LENGTH J. 15. 40. 57. 62. 73. 78.

AT QR OFLOW ELEVATION

1409.0 1.10.0 1410.5 1411.0 1411.5 1412.0 1412.5

PEAK QJIFF.15 1774. AT 1145 7.50 HOURS

SHEET 19 of 23

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLUXES IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN RATIO	RATIOS APPLIED TO FLUXES	
				1	1.00
HYDROGRAPH AT	1	0.93	1	1076.	
		{ 2.86}	{	{ 30.48}	{
ROUTE TO	2	0.93	1	631.	
		{ 2.86}	{	{ 17.87}	{
ROUTE TO	3	0.33	1	555.	
		{ 2.86}	{	{ 15.71}	{
HYDROGRAPH AT	4	0.89	1	2638.	
		{ 3.32}	{	{ 74.89}	{
ROUTE TO	5	0.73	1	3057.	
		{ 12.38}	{	{ 86.57}	{
ROUTE TO	6	0.73	1	832.	
		{ 12.38}	{	{ 23.55}	{
ROUTE TO	7	0.76	1	831.	
		{ 12.38}	{	{ 23.55}	{
HYDROGRAPH AT	8	0.83	1	1560.	
		{ 3.79}	{	{ 44.65}	{
ROUTE TO	9	0.69	1	1896.	
		{ 17.17}	{	{ 53.20}	{
ROUTE TO	10	0.69	1	1774.	
		{ 17.17}	{	{ 50.23}	{

SHEET 20 OF 23

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 PREC. DAM				INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
	ELEVATION	1433.00	1433.00	1430.20	1430.20	1430.20
STORAGE	971.	971.	971.	1348.	1348.	1348.
OUTFLOW	0.	0.	0.	713.	713.	713.
RATIO OF ASSESSOR PHF	MAXIMUM DEPTH OVER DAM ASSESSOR LEVEL	MAXIMUM STORAGE AC-FT	MAXIMUM WATER LEVEL CFS	DURATION OVER TOP HOURS	TIME OF FAILURE HOURS	TIME OF FAILURE HOURS
1.00	1436.51	0.31	1391.	832.	2.67	9.00
					0.0	

PLAN 1 STATION 1

	MAXIMUM FLUID LEVELS	STATION 1 HOURS
1.00	831.	1419.9

SHEET 27 OF 23

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 Poor. Poor. Poor.				INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1409.00	1409.00	1409.60			
STORAGE	54.	54.	62.			
DISCHARGE	0.	0.	19.			
WATERFALL						

RATIO	MAXIMUM DEPTH OF RESERVOIR	MAXIMUM STORAGE OVER DAM	MAXIMUM HEAD	DURATION	TIME OF OVER TOP	TIME OF FAILURE
OF PHF	AT S.ELEV	AC-FT	EPS	HOURS	HOURS	HOURS
1.00	1413.92	4.32	136.	1.77e-000	0.00	0.0

100-YEAR Flood Routing

SHEET 23 OF 23

APPENDIX E

PLATES

CONTENTS

Plate 1 - Location Plan

Plate 2 - Watershed Map

Plate 3 - Field Sketch Plan from Field Inspection

Plate 4 - Top of Dam Profile and Typical Cross Section
from Field Inspection

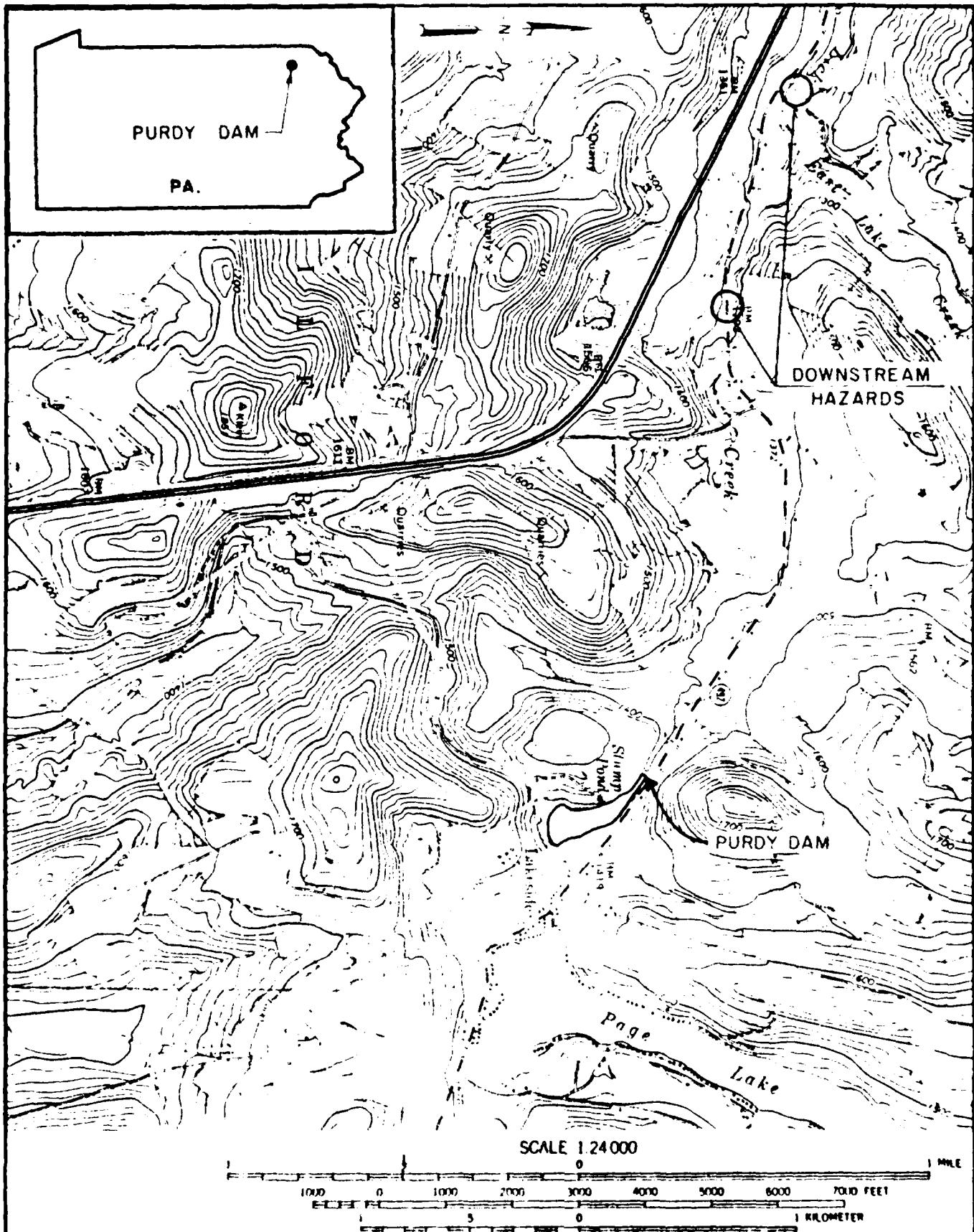
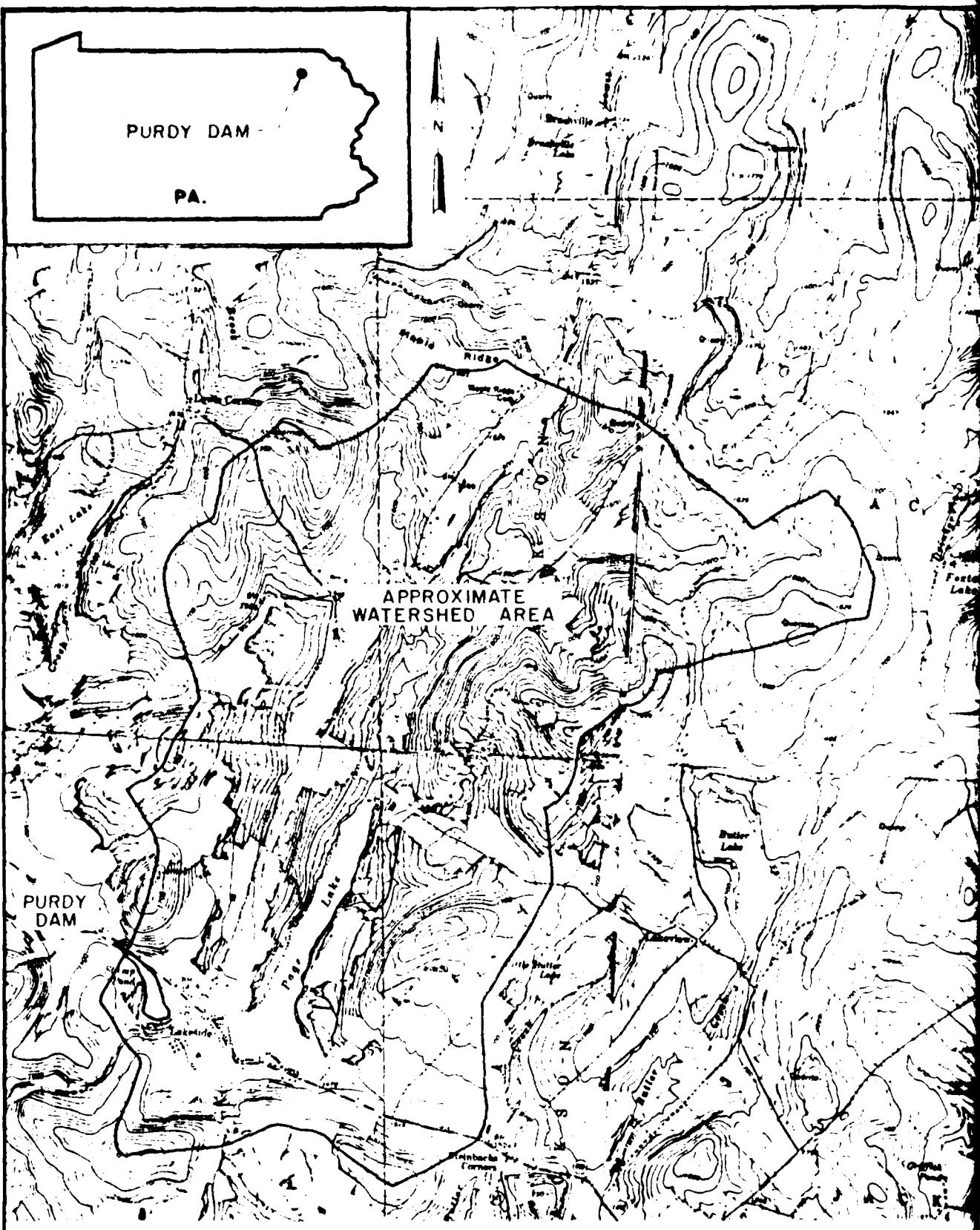


PLATE I LOCATION PLAN
PURDY DAM

REFERENCES:
1 USGS 7.5 HARFORD, PA.
QUADRANGLE PHOTOREVISED 1978



REFERENCES

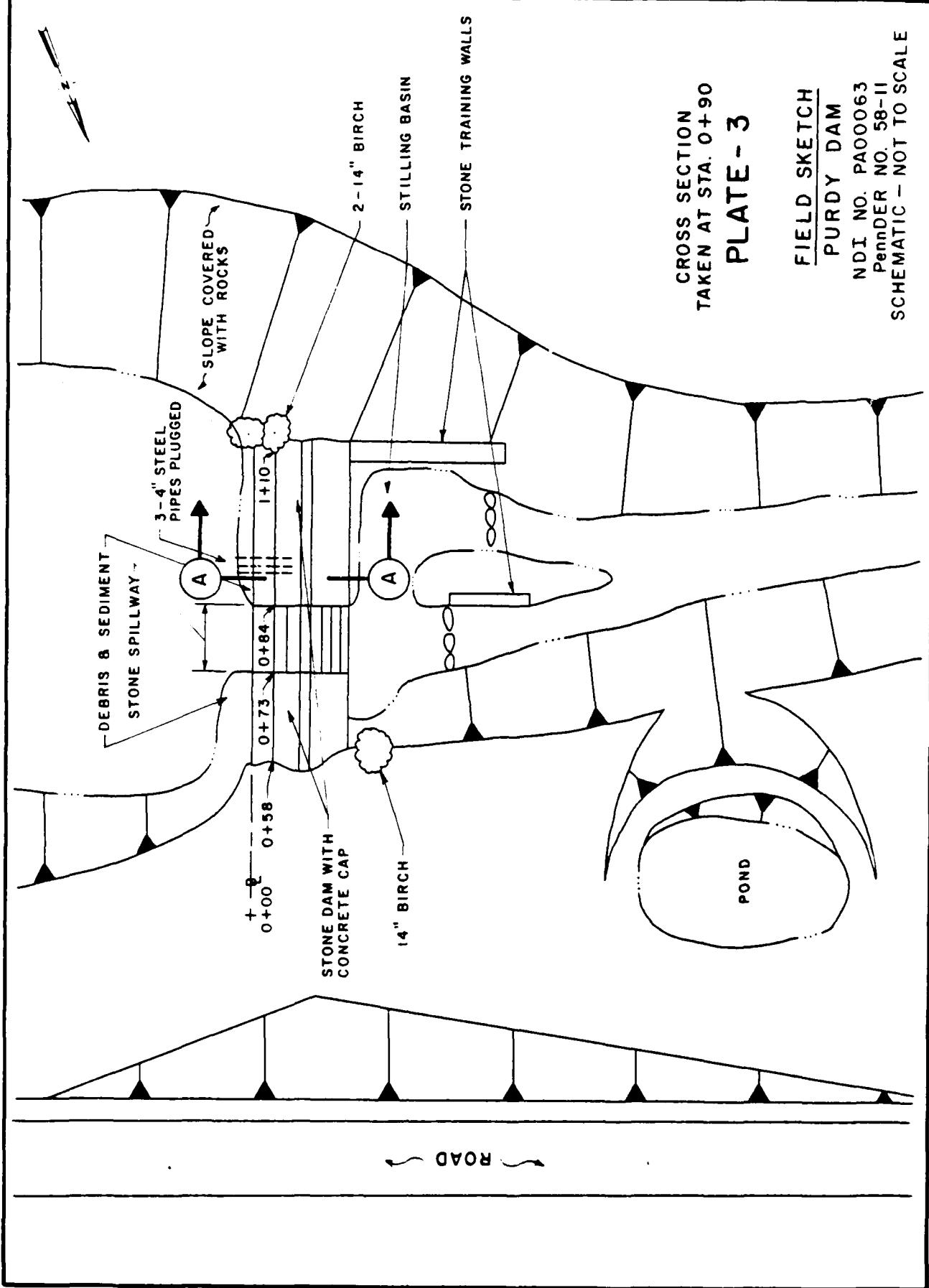
- 1 USGS 7.5' SUSQUEHANNA, PA.
QUADRANGLE 1968
- 2 USGS 7.5' THOMPSON, PA.
QUADRANGLE PHOTOREVISED 1978
- 3 USGS 7.5' HARFORD, PA.
QUADRANGLE PHOTOREVISED 1978
- 4 USGS 7.5' GREAT BEND, PA.
QUADRANGLE PHOTOREVISED 1978

SCALE 1: 32,640

PLATE 2 WATERSHED MAP
PURDY DAM

CROSS SECTION
TAKEN AT STA. 0+90
PLATE - 3

FIELD SKETCH
PURDY DAM
NDI NO. PA00063
PENN DERR NO. 58-II
SCHEMATIC - NOT TO SCALE



MICHAEL BAKER, JR., INC.

THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PURRY DAM

S.O. No. 13837-00-ARR-04

Sheet No. 4 of 23

Drawing No. _____

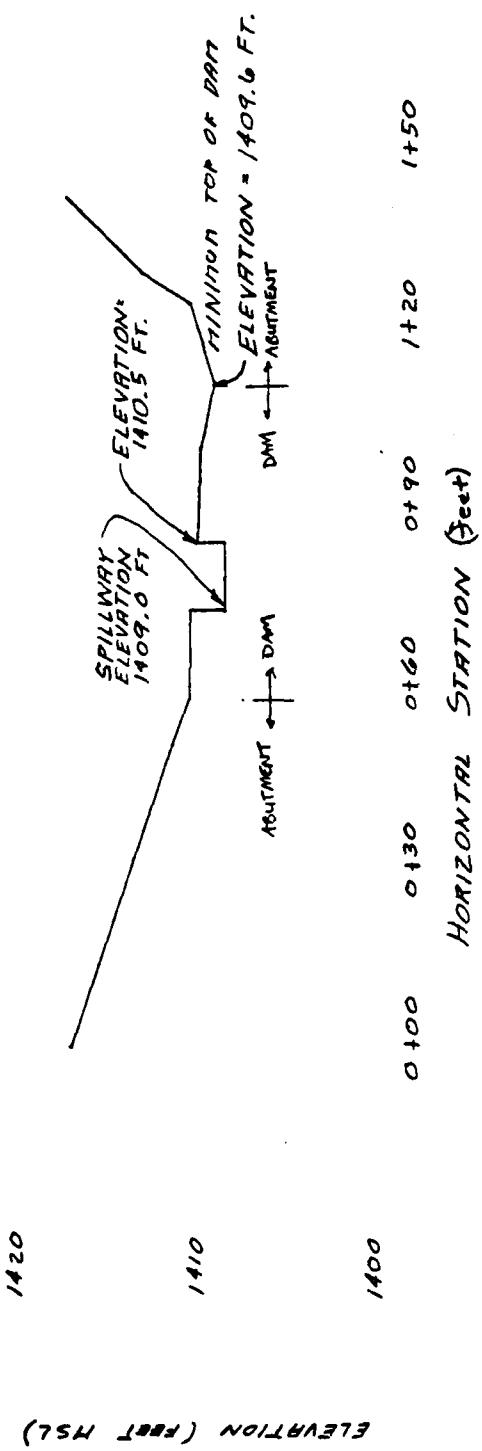
TOP OF DAM PROFILE

TYPICAL CROSS SECTION

Computed by GWT Checked by WDL

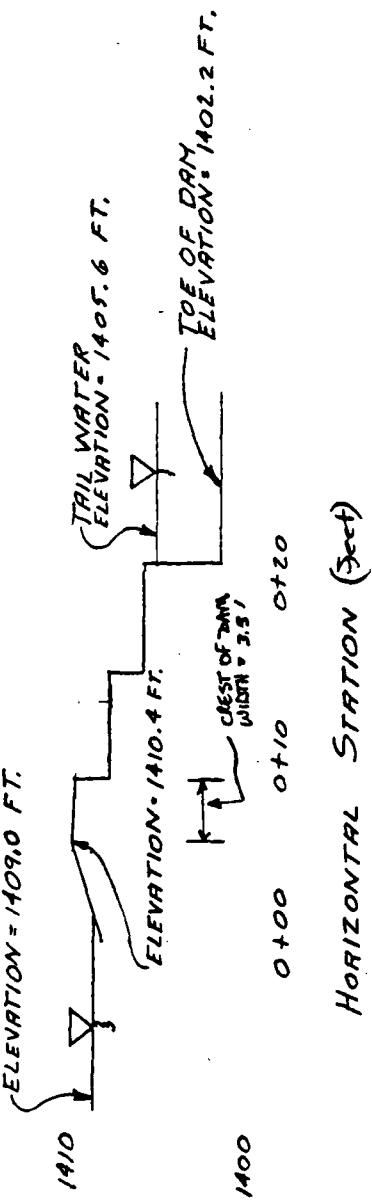
Date 11-17-80

Top Of Dam Profile (looking upstream)



ELEVATION (FEET MSL)

Typical Cross Section



ELEVATION (FEET MSL)

PLATE 4

APPENDIX F

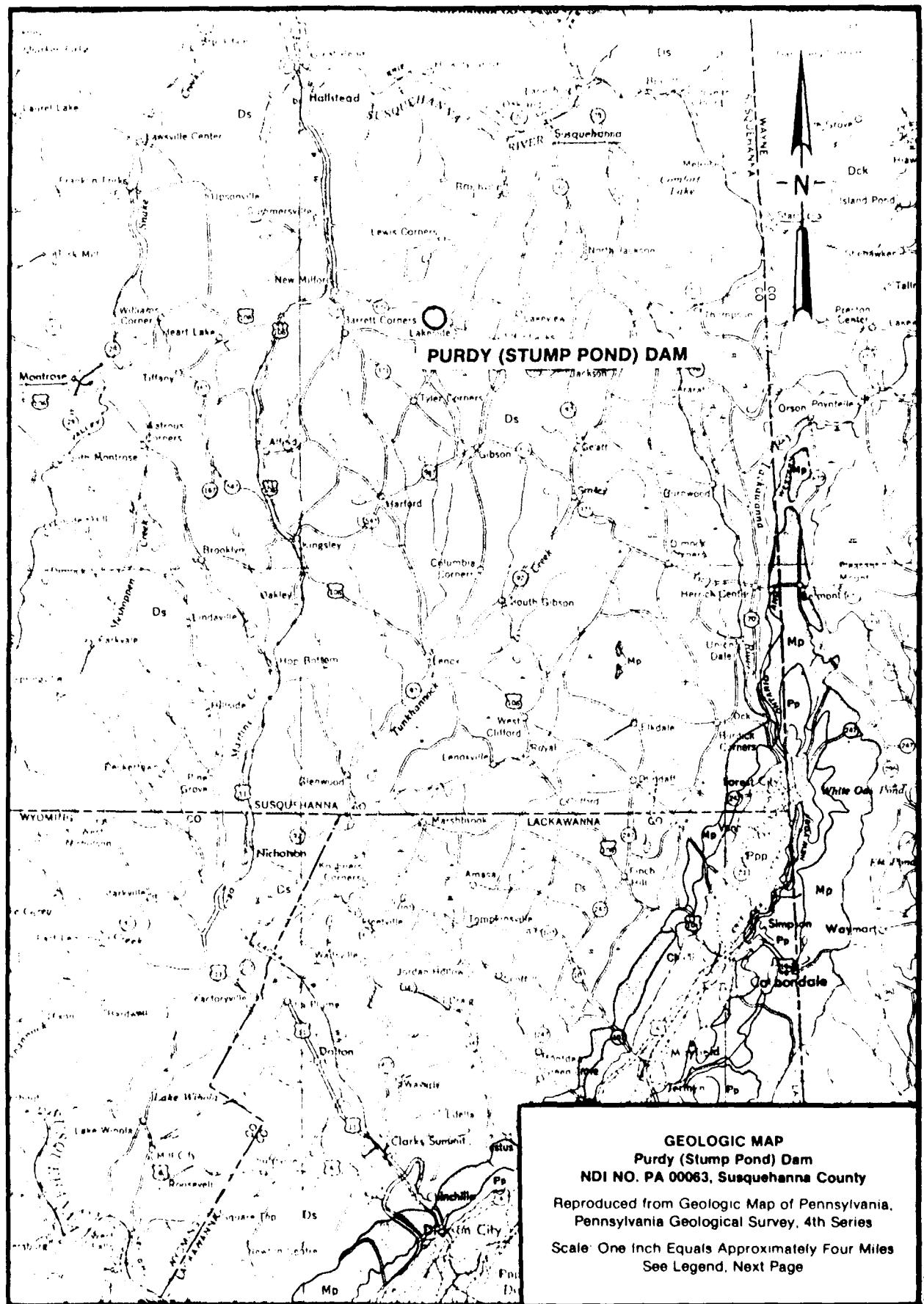
REGIONAL GEOLOGY

PURDY (STUMP POND) DAM
NDI No. PA 00063, PennDER No. 58-11

REGIONAL GEOLOGY

Purdy Dam is situated in the Glaciated Low Plateaus physiographic province. The area has undergone glaciation at least three times and is presently covered with Wisconsin stage glacial deposits. According to the Soil Conservation Service's Soil Survey for Susquehanna County, the surface soils consist primarily of slightly stoney, silt loams of the Morris-Wellsboro-Volusia association. No test boring data were available for review, thus, the thickness of this overburned is difficult to ascertain.

Geologic references indicate that the bedrock in the vicinity of the dam consists primarily of members of the Catskill Formation in the Susquehanna Group. These are chiefly red and gray shales and sandstones of Upper Devonian age. The formation also contains scattered, thin, coal streaks and scattered fish remains. A bedrock sample obtained at the dam site was a hard olive green, fine grained sandstone. The strata in the area were deposited in a bay or delta front environment and remained essentially horizontal after the Appalachian Uplift.



GEOLOGY MAP LEGEND

DEVONIAN

UPPER

WESTERN PENNSYLVANIA

Dow Dr

Oswayo Formation
Greenish gray to gray shales, sandstones and
intercyclic dolomites becoming increasingly shale
dominated, associated equivalent to *Type*
Crinoid, *Reticular* Formation, or in Erie
and Crawford Counties, probably not
distinguishable with certainty.

Dct

Cattaraugus Formation
Red, gray, and brown shale and sandstone
with the properties of red decreasing west
and becoming more silty. Includes *Venango*, *Sands*, *Shaler* and
Saunderston sandstones, and equivalents.
Also some limestone, *Conewango* and *Felt*
shale.

Dct

Conneaut Group
Alternating gray, brown, greenish, and
blackish shales and sandstones, includes
Evergreen shales and sandstones, *Chemung*
pink shales, *Oriskany* and "Girard"
Formations of northwestern
Pennsylvania.

Dcn

Canadaway Formation
Alternating brown shales and sandstones
includes "Portage" Formation, etc., north
western Penn. area.

CENTRAL AND EASTERN PENNSYLVANIA

Doo

Oswayo Formation
Brownish and greenish gray, fine and
medium grained sandstones with some
shales and scattered carbonaceous lenses,
includes red shales which become more
numerous eastward. Relation to *Type*
Crinoid and *Reticular*.

Dck

Catskill Formation
Cheerfully red to brownish shales and sand-
stones, includes gray and greenish non-
limestone tongues named *Elk Mountain*,
Honesdale, *Shohola*, and *Delaware River*
in the east?

Dm

Marine beds
Gray to olive brown shales, graywackes,
and sandstones, includes "Chemung" beds
and "Portage" beds, including *Bucktail*,
Brantler, *Hazell*, and *Trimmers Rock*
Poly Limestone at base.

Ds

Susquehanna Group

Barbed line is "Champlain-Catskill" con-
tact of Second Pennsylvania. Susquehanna
County reports bars on Chemung side
of line.

MIDDLE AND LOWER

Dm

Mahantango Formation

Brown to olive shale with interbedded
sandstones which are dominant in places.
(Montebello highly fossiliferous in upper
part contains "Centerfield coral bed" in
easter Pennsylvania.)

Dm

Marcellus Formation

Black, fissile, carbonaceous shale with
thin, brown sandstone (*Clayton Ridge*) in
parts of central Pennsylvania.

Dmo

Onondaga Formation

Greenish blue, thin bedded shale and dark
blue to black, medium bedded limestone
with shale predominant in most places.
Includes *Selinsgrove* Limestone and *Seneca*
Shale in central Pennsylvania and *Esopus*
Shale in southeastern Pennsylvania. In
Letcher Gap area includes *Palmerton*
Sandstone and *Bowmanstown* Chert.

Do

Oriskany Formation
White to brown, fine to coarse grained,
partly calcareous, locally conglomerate,
massive as sandstone. *Oriskany* at the
top, dark gray, thick, thin bedded shale with
some intercalated shales and sandstones
below. *Shaler* below.

Dnb

Helderberg Formation
Dark gray, calcareous, thin bedded shale
(*Marine*) at the top, equivalent to *Port*
Knox Shale and *Benton* Limestone in the
east. Dark gray, thick, thin bedded
massive limestone (*New Scotland*)
with some local sandstones in the middle
and, at the base, dark gray, medium to
thick bedded, vesicular limestone
with numerous sandstones and shales in places with
some *Acervularia*.

DAT
FILM